STARCRAFT®

# OWNER'S MANUAL

## Folding Camping Trailers

***To our customers:*** *for your safety and that of others, it is necessary that you read and understand this entire manual prior to your first camping excursion.*

**As the owner of this Starcraft RV, Inc. brand product**
**you are eligible for active membership in the**
**Starcraft RV, Inc. Camper Club**
**For details write:**
**Director, Starcraft RV, Inc. Camper Club • P O Box 176 • Osceola, IN 46561-0176**

The Starcraft RV, Inc. Camper Club consists of the Starcraft RV, Inc. RV owners from coast to coast who enjoy organized recreational vehicle activity. As a member, you can attend several of the camping events organized each year by your state chapter and international office. Each July, you can spend a week at the Starcraft RV, Inc. International Camper Club Rally -- an event that attracts hundreds of Starcraft RV, Inc. families from all over North America. If that's not enough to convince you, here are more reasons why you should join:

- **Friendship Rallies**
- **Regional Rallies**
- **Yearly International Rally**
- **New Membership Kit & Membership Plaque**
- **Chatter Newspaper**
- **Discounts on Atlas, Campground Guides and Magazines**
- **Club Camping with other Starcraft RV, Inc. Members**

STARCRAFT®

Dear Starcraft Consumer:

Congratulations on your purchase of a Starcraft RV. On behalf of Starcraft RV, Inc., we, the Starcraft RV, Inc. employees, offer you our warmest welcome!

We greatly value the confidence you placed in Starcraft RV, Inc. by your recent purchasing decision. We are equally confident you will have many years of pleasant RV experiences in your new Starcraft RV, because of our continuing dedication of providing you with the most complete brand of consumer satisfaction in the RV Industry today: **Starcraft RV, Inc.**.

To help assure your continued satisfaction and enjoyment of your Starcraft RV we request you take the time right now to study and understand all of the information and pamphlets supplied with your Starcraft. The Owner's Manual is an invaluable resource containing important recommendations on proper usage, maintenance and servicing of your Starcraft RV. A few minutes spent learning the functions of the systems on your Starcraft plus the installation and operation of any appliances supplied with your Starcraft can reduce or eliminate future problems. Failure to properly maintain your RV will result in denial of warranty.

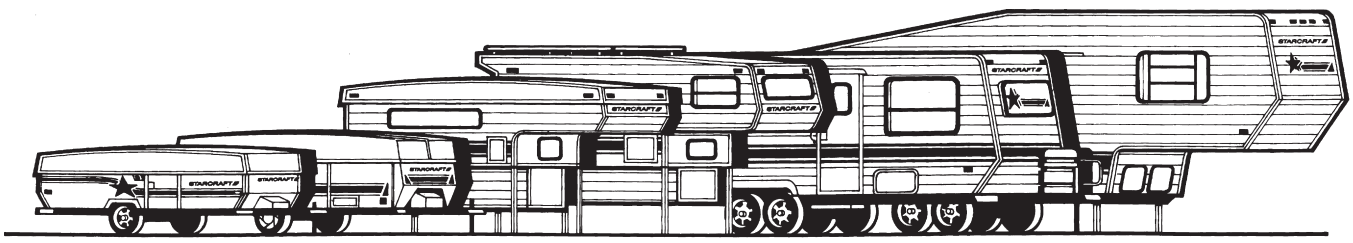
It is very important to validate all accompanying service warranties. Please take a minute now to complete the registration cards and mail the cards to the respective manufacturers, today.

If you should require service, an authorized Starcraft RV Dealer can properly service your Starcraft as well as answer other questions you may have.

Thank you for purchasing a Starcraft. We hope you are – and will continue to be – satisfied with your RV and will feel free to recommend a Starcraft to other members of your family, your friends and neighbors as well.

Most Cordially,

Starcraft RV, Inc. Family of Employees



**Starcraft RV, Inc., • P. O. Box 458 • Topeka IN 46571 • www.starcraftrv.com**

# Table of Contents


**Starcraft RV, Inc. 1-Year Limited Warranty ..... 3**
**Starcraft RV, Inc. Limited Roof Warranty ..... 6**
**Special Safety Procedures ..... 8**
**Introduction ..... 9**
Dealer's Responsibility ..... 9
Owner's Responsibility ..... 9
Insurance Coverage ..... 9
Dealer Review ..... 9
**Pre-Planning / Pre-Delivery ..... 10**
Hitch Requirements ..... 10
Wire Harness/Pigtail Installation ..... 10
Break-Away Switch ..... 10
Dolly Wheel Jack ..... 10
Coupler ..... 11
Safety Chain Installation ..... 11
Safety Chain Usage ..... 11
Mirrors ..... 11
Propane Set-Up ..... 11
**Pre-Travel Check ..... 12**
**Trip Preparation ..... 12**
Sanitize Water System ..... 12
Frame & Running Gear ..... 12
Spare Bulbs ..... 12
**Trailering ..... 13**
Driving ..... 13
Braking & Emergency Stops ..... 13
Runaway Camper ..... 13
Swaying ..... 13
Grades ..... 13
Backing ..... 13
Tire Change ..... 13
Tires ..... 14
Wheel Lug Nuts ..... 14
Federal Information Sticker ..... 14
Load Limits and Weight Distribution ..... 14
**To Weigh your Tow Vehicle and RV ..... 14**
Weight Distribution & Rating Definitions: ..... 15
Trailer Weight Information ..... 15
**Tire Safety ..... 16**
**Exterior Set-Up (non slideout models) ..... 21**
**Exterior Setup (slideout models) ..... 23**
**Interior Set-Up ..... 23**
Sink Cabinets ..... 23
Tables ..... 23
Beds ..... 23
Carry-Out Range ..... 23
Drape Retainer Cord Installation ..... 24
**Accessory Installation and Set-Up ..... 24**
Step Operation ..... 24
Installing the Awning & Screen Room ..... 24
Bunk End Hide-Away Installation Instructions ..... 24
Spare Tire Installation ..... 25
Bunk Light Installation ..... 25
Battery Installation ..... 26
**Water Systems ..... 26**
Water Fills ..... 26
Sink Drain ..... 27
Demand Pump ..... 27
Water Heater ..... 27
12 Volt Cassette Toilet ..... 27
Shower ..... 27
Sanitizing the Water Storage Tank ..... 27
Draining the Water System and Heater ..... 27
Winterizing the Water system ..... 28
**Electrical System ..... 28**
110 Volt AC ..... 28
Circuit Overload ..... 28
12 Volt DC ..... 28
Electric Brakes ..... 29
**Propane System ..... 29**
Single Propane Bottle ..... 30
Double Propane Bottles ..... 30
Auto Switch Over Valve ..... 31
Filling Propane Bottles ..... 31
Propane Bottle Maintenance ..... 31
Propane Line Check ..... 31
Regulator ..... 31
Freeze-Up ..... 31
**Lifter System ..... 31**
**Take-Down (non slideout models) ..... 32**
Interior ..... 32
Exterior ..... 32
**Take-Down (slideout models) ..... 32**
Interior ..... 32
Exterior ..... 32
**Miscellaneous ..... 33**
Appliances & Accessories ..... 33
Furnace ..... 33
Water Heater ..... 33
Refrigerator ..... 33
Air Conditioner ..... 33
**Fire Safety ..... 34**
Fire Extinguisher Locations ..... 34
Emergency Exits ..... 34
**Cold Weather Use ..... 34**
**Storage ..... 34**
**Condensation ..... 35**
Effects of Long Term/Cool Weather Occupancy ..... 35
Controlling Condensation ..... 35
**Warranty Repairs ..... 35**
**Service & Service Chart ..... 36**
**Standard Care ..... 37**
**Front Deck Models ..... 38**
**Tent Fabric Care and Maintenance ..... 39**
**Serial Number Identification Form ..... 40**
**Option Weights ..... 40**
**12 Volt Schematic ..... 41**
**Chassis Schematic ..... 42**
**Full Height Entrance Door Setup ..... 43**
**Swing Down Sink Faucet ..... 44**

# Starcraft RV, Inc. 1-Year Limited Warranty

## WHAT AND WHO IS COVERED

**The Starcraft RV, Inc. warranty covers the recreational vehicle ("RV"), when used only for its intended purpose of recreational travel and camping, for one (1) year. The warranty period begins on the date that the RV is delivered to the first retail purchaser by an independent, authorized dealer of Starcraft RV, Inc., or, if the dealer places the vehicle in service prior to retail sale, on the date the RV is first placed in such service. In the event that a substantial defect in material or workmanship, attributable to Starcraft RV, Inc. is found to exist during the warranty period, it will be repaired or replaced, at Starcraft RV, Inc.'s option, without charge to the RV owner, in accordance with the terms, conditions and limitations of this limited warranty.**

**This limited warranty applies to the first consumer purchaser, and the next subsequent owner, only. This limited warranty may be transferred once during the warranty period. However, the subsequent owner must submit a warranty transfer form to Starcraft RV, Inc. to make the warranty transfer effective. You may contact an independent, authorized dealer for details. All rights and limitations within this warranty are applicable to the original owner and the subsequent owner of the RV. The subsequent owner's warranty coverage period is the remaining balance of the warranty coverage period that the prior owner was entitled to under this limited warranty.**

**Starcraft RV, Inc.'s obligation to repair or replace defective materials or workmanship is the sole obligation of Starcraft RV, Inc. under this limited warranty. Starcraft RV, Inc. reserves the right to use new or remanufactured parts of similar quality to complete any work, and to make parts and design changes from time to time without notice to anyone. Starcraft RV, Inc. reserves the right to make changes in the design or material of its products without incurring any obligation to incorporate such changes in any product previously manufactured. Starcraft RV, Inc. makes no warranty as to the future performance of this RV, and this limited warranty is not intended to extend to the future performance of this RV, or any of its materials, components or parts. In addition, the RV owner's obligation to notify Starcraft RV, Inc., or one of its independent, authorized dealers, of a claimed defect does not modify any obligation placed on the RV owner to contact Starcraft RV, Inc. directly when attempting to pursue remedies under state or federal law.**

## LIMITATIONS, EXCLUSIONS AND DISCLAIMER OF IMPLIED WARRANTIES

**ANY IMPLIED WARRANTY THAT IS FOUND TO ARISE BY WAY OF STATE OR FEDERAL LAW, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS, IS LIMITED IN DURATION TO THE DURATION SET FORTH IN THIS LIMITED WARRANTY AND IS LIMITED IN SCOPE OF COVERAGE TO THE SCOPE OF COVERAGE OF THIS LIMITED WARRANTY. Starcraft RV, Inc. makes no warranty of any nature beyond that contained in this limited warranty. Starcraft RV, Inc. does not authorize any person to create any other obligation or liability for it regarding this RV, and Starcraft RV, Inc. is not responsible for any representation, promise or warranty made by any dealer or other person beyond what is expressly stated in this limited warranty, and no one has the authority to enlarge, amend or modify this limited warranty. Any selling or servicing dealer is not Starcraft RV, Inc.'s agent, but an independent entity.**

**STARCRAFT RV, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES THAT MAY RESULT FROM BREACH OF THIS LIMITED WARRANTY OR ANY IMPLIED WARRANTY. THIS EXCLUSION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES SHALL BE INDEPENDENT OF ANY FAILURE OF THE ESSENTIAL PURPOSE OF ANY WARRANTY, AND THIS EXCLUSION SHALL SURVIVE ANY DETERMINATION THAT THIS LIMITED WARRANTY OR ANY IMPLIED WARRANTY HAS FAILED OF ITS ESSENTIAL PURPOSE.**

**Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.**

## HOW TO GET SERVICE

**To obtain warranty service the owner must do all of the following:**

1. **Notify an independent, authorized dealer of Starcraft RV, Inc., or Starcraft RV, Inc., of the substantial defect in material or workmanship attributable to Starcraft RV, Inc., within the warranty coverage period designated above;**
2. **Provide the notification mentioned in (1), above, within ten (10) days of when the owner discovered, or should have discovered, the substantial defect in material or workmanship attributable to Starcraft RV, Inc.;**
3. **Promptly schedule an appointment with and take the RV to an independent, authorized dealer of Starcraft RV, Inc., or Starcraft RV, Inc., for repairs; and**
4. **Pays any freight or transportation costs, import duties, fees and all incidental expenses associated with obtaining warranty service.**

**For warranty service, simply contact one of Starcraft RV, Inc's independent, authorized service centers for an appointment and then deliver your RV to the service center on the specified appointment date. If you need assistance you may contact Starcraft RV, Inc. RV, Inc., at P.O. Box 458, Topeka, Indiana 46571, Attn: Warranty Department, (260) 593-2550, or http://www.starcraftrv.com.**

**NOTE: Starcraft RV, Inc. does not control the scheduling of service work at the independent, authorized dealerships. You may encounter some delay in scheduling or completion of work. Also, you must notify the selling dealer, or Starcraft RV, Inc., within three (3) days of delivery to have work performed on any defect or damage to appearance items that occurred at the factory during manufacturer, during delivery of the RV to the selling dealer or on the selling dealer's lot at no cost to you as provided by this limited warranty. (See below under WHAT IS NOT COVERED).**

**If two (2) or more service attempts have been made to correct any covered defect that you believe impairs the value, use or safety of the RV, or if it has taken longer than thirty (30) days for those types of repairs to be completed, you must, to the extent permitted by law, notify Starcraft RV, Inc. directly, in writing, at the above address, of the unsuccessful repair(s) of the alleged defect(s) so that Starcraft RV, Inc. can become directly involved in making sure that you are provided service pursuant to the terms of this limited warranty.**

## WHAT IS NOT COVERED

**By way of example only, this Limited Warranty does not cover any of the following: defects in materials, components or parts of the RV not attributable to Starcraft RV, Inc., items that are added or changed after the RV leaves the possession of Starcraft RV, Inc.; additional equipment or accessories installed at any dealership, or other place of business, or by any other party, other than Starcraft RV, Inc.; any RV used for rental or other commercial purposes (Note: It shall be concluded that the RV has been used for commercial and/or business purposes if the RV owner or user files a tax form claiming any business or commercial tax benefit related to the RV, or if the RV is purchased in a business name); any RV not used solely for recreational travel and camping or any RV used as a permanent or semi-permanent residence (Note: It shall be concluded that the RV has been used as a residence if you use it as your primary residence or for full time travel); normal wear, tear or usage, such as tears, punctures, soiling, mildew, fading, or discoloration of exterior plastic or fiberglass, or soft goods., such as upholstery, drapes, carpet, vinyl, screens, cushions, mattresses and fabrics; the effect of condensation or moisture from condensation inside the RV; mold or any damage caused by mold to the inside or outside of the RV; imperfections that do not affect the suitability of the RV for its intended purpose of recreational use or items that are working as designed but that you are unhappy with; problems, including water leaks, related to misuse, mishandling, neglect or abuse, including failure to maintain the RV in accordance with the owner's manual, or other routine maintenance such as proper use, storage, inspections, lubricating, adjustments, tightening of screws, tightening of lug nuts, sealing, rotating tires; damage due to accident, whether or not foreseeable, including any acts of weather or damage or corrosion due to the environment, theft, vandalism, fire, or other intervening acts not attributable to Starcraft RV, Inc.; damage resulting from tire wear or tire failure; defacing, scratches, dents, chips on any surface or fabric of the RV; damage caused by off road use, overloading the RV or alteration of the RV, or any of its components or parts; wheel alignment or adjustments to axles when caused by improper maintenance, loading or damage from road hazards, including off road travel, wheel damage or balancing or damage from tire failures.**

**In addition, this limited warranty does not cover any material, component or part of the RV that is warranted by another entity, including, by way of example, handling, braking, wheel balance, muffler, tires, tubes, batteries, gauges, generator, jacks, inverter, microwave, television, DVD, VCR, CD player, tape player, radio, speakers, television, refrigerator, range, water heater, stove, carbon monoxide detector, smoke detector, furnace or any air conditioner. (Note: The written warranty provided by the manufacturer of the component part is the direct responsibility of that manufacturer).**

**Defects and/or damage to interior and exterior surfaces, trim, upholstery and other appearance items may occur at the factory, during delivery of the RV to the selling dealer or on the selling dealer's lot. These items are usually detected and corrected at the factory or by the selling dealer prior to delivery to the retail customer. You must inspect your RV for this type of damage when you take delivery. If you find any such defect or damage you must notify the selling dealer, or Starcraft RV, Inc., immediately to have these items covered by this limited warranty and to have work performed on the items at no cost to you as provided by this limited warranty. The owner is responsible to inspect the RV prior to signing the "Inspection and Acceptance Declaration" section of the "Owner Protection Warranty Registration."**

## EVENTS DISCHARGING STARCRAFT RV, INC. FROM OBLIGATION UNDER WARRANTY

**Certain things completely discharge Starcraft RV, Inc. from any obligation under this warranty and void it. By way of example, the following shall discharge Starcraft RV, Inc. from any express or implied warranty obligation to repair or replace any defect that results from: any rental or other commercial use or purchase of the RV (as defined in this warranty), any defect in a separately manufactured component part, owner neglect or failure to provide routine maintenance (See Owner's Manual), unauthorized alteration, off road use, collision or accident, whether or not foreseeable, including any acts of weather or damage or corrosion due to the environment, theft, vandalism, fire, explosions, overloading in excess of weight ratings, and tampering with any portion of the RV.**

## LEGAL REMEDIES

**Any action to enforce any portion of this limited warranty, or any implied warranty, shall be commenced within six (6) months after expiration of the warranty coverage period designated above. Any performance of repairs shall not suspend any limitation period from expiring. Any performance of repairs after the warranty coverage period has expired, or performance of repairs regarding any thing excluded from coverage under this limited warranty shall be considered "good will" repairs, and they will not alter the express terms of this limited warranty, or extend the warranty coverage period or this limitation period in this paragraph. In addition, this warranty is not intended to extend to future performance, and nothing in this warranty, or any action of Starcraft RV, Inc., or any agent of Starcraft RV, Inc., shall be interpreted as an extension of the warranty or this limitation period. Some states do not allow a reduction in the statue of limitations, so this reduction may not apply to you.**

## WARRANTY REGISTRATIONS

**Your warranty registration records should be completed and delivered to the manufacturers of component parts. The selling dealership will assist you in completing and filling out the Starcraft RV, Inc. Owner Protection Warranty Registration form. That form must be returned to Starcraft RV, Inc. within the (10) days of your taking delivery of the RV. Your Starcraft RV, Inc. warranty will not be registered unless this warranty registration is completed and received by Starcraft RV, Inc.. Failure to file this warranty registration with Starcraft RV, Inc. will not affect your rights under this limited warranty as long as you can present proof of purchase, but it can cause delays in obtaining the benefits of this limited warranty, and it may inhibit any servicing facility's ability to provide proper repairs and/or part replacement. The selling dealer is also obligated to maintain the RV prior to retail sale, to perform a pre-delivery inspection with the customer, and to repair and replace any parts necessary and correct defects in materials or workmanship prior to delivery.**

## CARE AND MAINTENANCE

**It is the Owner's responsibility to perform proper care and maintenance of the RV, and to assure correct load distribution. For details regarding this, please see your Starcraft RV, Inc. owner's manual and the owner's manuals of other component part manufacturers. These outline various care and maintenance that is required to maintain your RV. Please review all manuals supplied with your RV, and contact your selling dealership or supplier of the component part if you have questions. Note: Failure to maintain the RV as noted in those manuals voids this limited warranty, and any damage to the RV as a result of your failure to perform such care, is not covered by this limited warranty.**

**THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE.**

**"If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Starcraft RV, Inc.**

**If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Starcraft RV, Inc.**

**To contact NHTSA, you may either call the auto Safety hotline toll free at 1-800-424-9393 (or 366-0123 in Washington, D.C. area) or write to NHTSA, U.S. Department of Transportation, Washington, D.C. 20590. You can also obtain other information about motor vehicle safety from the Hotline."**

**STARCRAFT RV, INC.**
**P.O. Box 458, Topeka, Indiana 46571**
**Telephone: (260) 593-2550**

# EXTENDED LIMITED WARRANTY

## FOLDING CAMPING TRAILERS
## FLOOR, LIFTER SYSTEM, ROOF, TENT
## SUMMARY OF LIMITED WARRANTY:

**Starcraft RV, Inc. provides extended limited warranties on the floor, lifter system, roof and tent of folding camping trailers as outlined below. Starcraft RV, Inc. warrants that all parts of our manufacture are free from substantial defects in materials and workmanship during the warranty period, under normal use and service, when used for its intended purpose of recreational travel and camping. The warranty period shall begin on the date the vehicle is sold to the first retail purchaser. These extended warranties are not transferable to a second purchaser.**

### FLOOR:

**Starcraft RV, Inc. extends to the original purchaser a limited lifetime warranty on the floor against functional defects in material and workmanship in the structural integrity of the floor itself for the lifetime of the folding camping trailer.**

**EXCLUSIONS TO FLOOR WARRANTY: Damages to the floor itself, caused by standing water, are not covered under this limited lifetime warranty. The vinyl floor covering (linoleum) is NOT part of this limited lifetime warranty nor is it warranted against gouges, cuts or tears unless noted at time of delivery. Normal wear and tear on the vinyl flooring are also excluded from this warranty.**

### LIFTER SYSTEM:

**Starcraft RV, Inc. extends to the original purchaser a limited lifetime warranty on the lifter system against functional defects in material and workmanship. This warranty will provide both parts and labor required to correct any defects in material and workmanship for the lifetime of the folding camping trailer.**

**EXCLUSIONS TO LIFTER SYSTEM WARRANTY: Any damage caused by improper installation, maintenance, or repair; alterations to the lifter system or use of other than Starcraft RV, Inc. recommended parts. Normal adjustments to the lifter system are covered for the first 12 months only. Normal use, wear and tear and excess exposure to the elements are not covered. Adjustments to the roof height on units using the power winch are not covered under this limited lifetime warranty.**

### ROOF ASSEMBLY:

**Starcraft RV, Inc. extends to the original purchaser a limited lifetime warranty on the roof assembly of the camper against functional defects in material and workmanship. Parts are covered forever but labor and shipping for the first two years only.**

**EXCLUSIONS TO THE ROOF WARRANTY: This warranty does not include routine maintenance, surface finish, resealing, or damages due to the installation of nonstandard equipment. All roof seams and moldings must be resealed (cap sealed) at least once each year. NOTE: Snow loads must be removed from the roof to avoid damage to the roof.**

### TENT ASSEMBLY:

**Starcraft RV, Inc. extends to the original purchaser a limited lifetime warranty on the tent material for seven (7) years against functional defects in material and workmanship. Sewing defects, zipper problems and leaks will be covered for the first two years only, including parts labor and shipping. Problems such as these will be remedied by sending the tent section back to the Starcraft RV, Inc. production facility for repair. During years 3 through 7, only Starcraft RV, Inc.'s factory labor and return shipping after repair will be covered. Dealer labor to remove and reinstall the tent, plus shipping cost to Starcraft RV, Inc. is not covered during this time.**

**EXCLUSIONS TO THE TENT WARRANTY: The tent is not warranted against fading, discoloration, soiling, shrinkage, dry rotting, leaking due to contaminants, mold or mildew from condensation or storing tent when wet, or problems resulting from misuse or abuse. Rips, tears and damages caused by insects and/or rodents are not covered under any warranty.**

**REMINDER: Warranties for the floor, lifter system, roof and tent are not transferable and are limited to functional defects only.**

## HOW TO GET SERVICE

**To obtain warranty service the owner must do all of the following:**

1. **Notify an independent, authorized dealer of Starcraft RV, Inc., or Starcraft RV, Inc., of the substantial defect in material or workmanship attributable to Starcraft RV, Inc., within the warranty coverage period designated;**
2. **Provide the notification mentioned in (1), above, within ten (10) days of when the owner discovered, or should have discovered, the substantial defect in material or workmanship attributable to Starcraft RV, Inc.;**
3. **Promptly schedule an appointment with and take the RV to an independent, authorized dealer of Starcraft RV, Inc., or Starcraft RV, Inc., for repairs; and**
4. **Pays any freight or transportation costs, import duties, fees and all incidental expenses associated with obtaining warranty service.**

**For warranty service, simply contact one of Starcraft RV, Inc.'s independent, authorized service centers for an appointment and then deliver your RV to the service center on the specified appointment date. If you need assistance you may contact Starcraft RV, Inc., at P.O. Box 458, Topeka, Indiana 46571, Attn: Warranty Department, (260) 593-2550, or http://www.starcraftrv.com.**

**NOTE: Starcraft RV, Inc. does not control the scheduling of service work at the independent, authorized dealerships. You may encounter some delay in scheduling or completion of work. If two (2) or more service attempts have been made to correct any covered defect that you believe impairs the value, use or safety of the RV, or if it has taken longer than thirty (30) days for those types of repairs to be completed, you must, to the extent permitted by law, notify Starcraft RV, Inc. directly, in writing, at the above address, of the unsuccessful repair(s) of the alleged defects(s) so that Starcraft RV, Inc. can become directly involved in making sure that you are provided service pursuant to the terms of this limited warranty.**

## WHAT IS NOT COVERED

**By way of example only, this Limited Warranty does not cover any of the following: defects in materials, components or parts of the RV not attributable to Starcraft RV, Inc., items that are added or changed after the RV leaves the possession of Starcraft RV, Inc., or installation of nonstandard equipment; normal wear, tear or usage, failure to maintain the RV in accordance with the owner's manual, or other routine maintenance, surface finish, resealing, or the cost of labor or shipping for any service work on the roof after the first two years.**

## WARRANTY REGISTRATIONS

**Your warranty registration records should be completed and delivered to the manufacturers of component parts. The selling dealership will assist you in completing and filling out the Starcraft RV, Inc. Owner Protection Warranty Registration form. That form must be returned to Starcraft RV, Inc. within ten (10) days of your taking delivery of the RV.**

**THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE.**

**STARCRAFT RV, INC.**
**P.O. Box 458, Topeka, Indiana 46571**
**Telephone: (260) 593-2550**

# Special Safety Procedures

In order to make your camping experience a safe one, it is important that EVERYONE who is going to use your camper be familiar with the operating instructions contained in this manual. The following are some safety points which are discussed more fully later in this manual, but we want to EMPHASIZE THAT YOU READ THEM HERE AS WELL:

**1. Learn to drive with your unit.** Driving with a trailer is not the same as driving your car. You must take time and get the instruction (if necessary) to learn the different driving characteristics and maneuvering procedures (see TOWING EQUIPMENT and DRIVING RULES sections in this manual).

**2. Know how to respond to a propane leak.** A propane leak could cause an explosion.

**⚠ DANGER**

**IF YOU SMELL PROPANE**

1. Extinguish any open flames, pilot lights and all smoking materials.
2. Do not touch electrical switches.
3. Shut off the propane supply at the container valve(s) or propane supply connection.
4. Open doors and other ventilating openings.
5. Leave the area until odor clears.
6. Have the propane system checked and leakage source corrected before using again.

FAILURE TO COMPLY COULD RESULT IN EXPLOSION RESULTING IN DEATH OR SERIOUS INJURY. DD-90

**3. DO NOT use propane while traveling.** The main propane service valve must be shut off while traveling because of the danger of a fire or explosion if a propane line under pressure were ruptured in an accident. In addition to being unsafe, it is **ILLEGAL** in some states to operate a propane appliance while the vehicle is in motion.

**4. Refilling the propane bottle.** Never smoke or light an open flame either inside your unit or near it while the propane bottle is being refilled. Use an approved leak detector kit or soapy water solution when checking for leaks; never use an open flame. To avoid an explosion when you reinstall your bottle, make sure that all valves are off and pilot lights out **BEFORE YOU OPEN THE SERVICE VALVE ON THE REFILLED BOTTLE.**

**5. Cooking.** Great caution should be exercised when cooking inside your camper. Cooking devices emit exhaust fumes which contain deadly carbon monoxide. Combustion also consumes oxygen which is necessary for breathing to sustain life; therefore, steps must be taken to disburse carbon monoxide and supply combustion air in order to avoid asphyxiation. Open the roof vent and a window to provide adequate ventilation when cooking. Portable cooking devices, including grills and stoves, which burn wood or charcoal should never be used inside your camper, as they may cause fire or asphyxiation.

**⚠ WARNING**

**IT IS NOT SAFE TO USE COOKING APPLIANCES FOR COMFORT HEATING.**

Cooking appliances need fresh air for safe operation.

Before operation:

1. Open overhead vent or turn on exhaust fan.
2. Open window.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY. DD-26C

**WARNING: Propane containers shall not be placed or stored inside the vehicle. Propane containers are equipped with safety devices that relieve excessive pressure by discharging propane to the atmosphere.**

**WARNING: IT IS NOT SAFE TO USE COOKING APPLIANCES FOR COMFORT HEATING.**

**6. Water.** When a disinfectant or antifreeze solution has been put into the unit's water system, do not use the system until it has been thoroughly flushed with water. Starcraft RV, Inc. recommends that you fill the water system with water 4 - 6 times to assure that it has been flushed thoroughly. Keep children away from the unit until the water is safe to drink. Use only the following types of antifreeze: (A) 60% glycerol, by weight in water, undiluted, or (B) 22% magnesium chloride by weight, in water, undiluted. Store bought potable, non toxic RV antifreeze may be used.

**WARNING: Automotive, radiator or windshield washer antifreeze could be harmful or fatal if swallowed. Do not use them in the fresh water system or to protect drain traps from freezing.**

**7. Hookup to campground electrical system.** The power cord provided with your unit is normally adequate, but if you need an extension, be sure to use a 3-wire extension cord rated for at least 30 amps. If you use a 2-wire extension cord or a cheater plug with the third pin removed, your unit would not be properly grounded and someone could receive a serious, even fatal, shock. Your system might burn out a power cord rated at less than 30 amps.

**WARNING: If using 110 volt appliances outside the camper, use only the exterior receptacle which is protected by a GFI (ground fault interrupter) circuit breaker to protect against electrical shock.**

**8. Towing your vehicle.** Never travel with a hitch mounting below or more than 3 inches above a level trailer, or a hitch weight that overloads the tow vehicle axle. Carefully calculate and follow the weight capacity instructions contained in this manual.

# Introduction

This manual contains operating and maintenance information that will familiarize you with your unit, along with some helpful suggestions to get you started. Most information applies to the full range of camping trailers Starcraft RV, Inc. RV manufactures; specific characteristics of certain units are clearly titled. Photographs of unfamiliar items will help you quickly become acquainted with them.

## Dealer's Responsibility

Your Starcraft RV, Inc. RV dealer is responsible for servicing your warranty claims under Starcraft RV, Inc.'s Warranty program, but he does not himself warrant the unit. The dealer is also responsible for pre-delivery inspection on all new units sold to his customers, and for the *Dealer Review* described below.

## Owner's Responsibility

**Proper maintenance and care of your Starcraft RV, Inc. RV unit will help you better enjoy the safe operation of your unit and will help you achieve lower operating costs.**

**Regular and proper maintenance should be performed as indicated in the maintenance section of this manual.**

## Insurance Coverage

Make sure your unit is insured. Contact your insurance agent prior to picking up your unit for information concerning your policy coverage.

## Dealer Review

At the time of delivery we recommend the following steps be taken:

1. Review the Owner's Manual with the dealer. If you have any questions, he has the expertise to answer them and explain such things as hitch requirements and the weight information decal.
2. Go through the complete setup procedure and visually inspect the unit for any minor adjustments you feel are necessary. Have the dealer demonstrate the operation of all appliances, systems, and options.
3. Once you're satisfied that you understand the internal and external workings, road test it with the dealer. If you are not already familiar with cornering and backing procedures, you'll appreciate having a veteran with you.
4. This may be a good time to consider purchasing the following items that are mentioned throughout the manual. These items will provide a greater capacity for camping ease and enjoyment.
   a) Electric Brake Control – The trailer brakes, if so equipped, can be operated separately for surer stopping and better bad weather handling.
   b) Voltage Line Monitor – This lets you check the voltage entering your trailer. If the voltage in the campground drops, your appliances may be damaged.
   c) Drain – A black garden hose should be used to distinguish the drain from the white fresh water hose.
   d) Stabilizer Jacks – When at the four corners of your unit, they provide added stability.
   e) Hose/City Fill – Just in case a city water hookup is provided at your campsite, carry a white garden hose.
   f) Water Pressure Reducer – Water pressure at the campsite may be more than 60 PSI. A reducer will protect your water lines from bursting.
   g) Extension Cord – For use if the 36 foot cord provided is not long enough to reach the campsite hookup. Use a heavy 3-wire type extension: rated for 30 amp (ten gauge wire).
   h) Step Ramp – Use to level the trailer if the campsite is not level. It can be built at home using 2x6's.

# Pre-Planning / Pre-Delivery

## Hitch Requirements

**A top-quality Class II hitch, properly installed to pull your trailer level is essential for trouble-free towing. On a flat surface, measure from the bottom of the frame to the ground under the front and rear of the unit. When these measurements agree, measure from the top of the coupler to the ground. This is your hitch height. This information will be needed by the installer of your hitch. Starcraft RV, Inc. fold down camping trailers use 2" or 2-5/16 hitch ball sizes. Make sure you use the correct ball size to match you camper.**

**WARNING: NEVER travel with a hitch set up that does not make the trailer and tow vehicle level. Do not allow the hitch weight to overload the tow vehicle's rear axle. Failure to comply could result in traffic hazard, poor handling, damage to the tow vehicle, or failure of the trailer axle, tires and bearings. These resulting failures are not warrantable.**

## Weight Distribution System

**A weight distributing hitch system provides a more stable tow vehicle and trailer combination. This system will spread the weight evenly to distribute it to the tow vehicle front and rear axles and the trailer axle. Consult with your RV dealer to familiarize yourself with the operation and requirements of the weight distributing hitch systems. Be certain your tow vehicle can carry the hitch weight**

**NOTICE: A weight distribution system is recommended on RT, Centennial and campers with slide out rooms.**

## Wire Harness/Pigtail Installation

**In addition to a hitch, you will also need to attach the camper pigtail to the towing vehicle electrical harness. Contact your tow vehicle dealer for correct gauges of wire, connection assistance, heavy duty flasher and battery isolator if necessary, for charging the battery in your unit.**

**Make certain the installation allows sufficient slack for turning, but not enough to touch the ground. Although the factory has already tested your electrical system, check all lights before you tow.**

## Break-Away Switch

**Starcraft RV, Inc. fold-down camping trailers that have been equipped with electric brakes are also supplied with a break-away switch which is capable of operating the brakes in case the trailer and tow vehicle are separated.**

**An on board deep cycle battery can supply power to the brakes through the break away switch.**

**The break away switch plunger cable should be connected to the tow vehicle with enough slack to allow the vehicle to turn without actuating the switch. Use an eyebolt to attach the cable to tow vehicle's bumper. DO NOT loop the cable over the hitch ball, attach it to the hook on the safety chain, or attach it in any other manner that might cause the break-away features to operate accidentally.**

**WARNING: NEVER use the break-away switch as a parking brake. The current needed to operate the brakes will drain the battery in a short time and the brakes will release when the voltage fails.**

| Camper Wire Color | Function | Car Hookup |
|---|---|---|
| Yellow | NLU | |
| White | Ground | Car Frame |
| Brown | Right Turn/Stop | Right Turn/Stop |
| Red | Left Turn/Stop | Left Turn/Stop |
| Green | Clearance Lights | Running Lights |
| Blue | Brakes | Brake Controller |
| Large Black | Charge Line | Battery or Isolator (fused) |

## Dolly Wheel Jack – All Models

**Turn the crank clockwise to raise the camper to connect to, or disconnect from the tow vehicle. For travel, retract the dolly wheel (cranking counter clockwise) several inches off the ground and remove the wheel, stowing it in the camper or the tow vehicle.**

Fig. 1.
Starcraft RV, Inc. dolly wheel jack.

Fig. 2. Dolly wheel jack in retracted travel position.

Fig. 3. Starcraft RV, Inc. coupler closed.

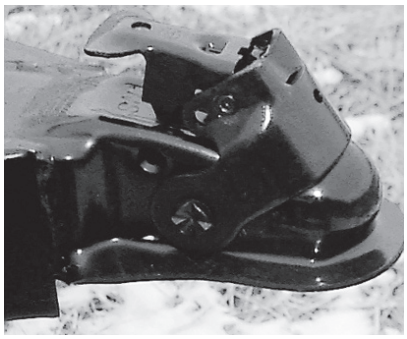


Fig. 4. Starcraft RV, Inc. coupler open.

## Coupler

To operate the coupler, lift the latch lever. While holding the latch lever up, pull the latch nose upward and rearward. The mechanism slides rearward to operate ball clamp. To latch on the ball, simply slide the mechanism forward.

**NOTE:** Starcraft RV, Inc. couplers are not adjustable for ball fit. See Figs. 3 & 4.

**NOTE:** For safety, and to prevent possible unlatching, all trailer coupler latches, when in transit, should be secured with a safety pin, a 1/4″ bolt, or a padlock.

## Safety Chain Installation

NOTE: IT IS THE DEALER'S RESPONSIBILITY TO ENSURE THAT THE SAFETY CHAIN IS INSTALLED CORRECTLY BEFORE THE UNIT IS DELIVERED.

*Fold-Down Camper Safety Chain Installation:*

1. Thread the chain into the frame structure from the underside where the coupler and A-frame join, threading the chain around the jack tube.
2. Center the chain for equal lengths on each side.
3. With chains at equal lengths insert a 3/8″ x 1-1/2″ grade 5 bolt with a 3/8″ washer through a link of each chain, as close to the coupler as possible, with a second washer and a locknut turned flush with the end of the bolt. See Fig. 5 & 5A.

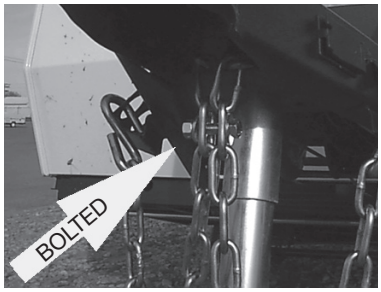
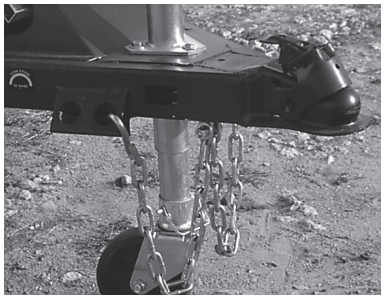



Fig. 5 & 5A. Starcraft RV, Inc. safety chain installed and bolted.



## Safety Chain Usage

Cross the safety chains, provided with your camper, under the "A" frame and attach them to the hitch platform, or to eyebolts installed in the towing vehicle.

**NOTE:** State regulations require that the safety chains must be crossed under the tongue to prevent a hitch or coupling failure from dropping the tongue on the road. If a chain is damaged, regulations prohibit welding or splicing a new length of chain to it. Replace the entire chain and hook assembly.

Provide enough slack to turn corners freely, but do not allow the chain to drag on the pavement.

## Mirrors

The mirrors on your car must allow you to see beyond your trailer. A set of auxiliary mirrors are invaluable during backing and driving. Most are not permanent and are quickly installed or removed.

## Propane Set-Up

If the dealer has not already done so, request he install the propane bottle holder and bottle(s) as well as make the necessary connections to the regulator and bulkhead. For instructions, check the Owner's Packet. Either the Starcraft RV, Inc. dealer or a qualified propane dealer should then fill the bottle(s) and check all connections with a leak detector and also check the propane regulator to ensure proper propane pressure to the appliances.

**NOTE:** Check state regulations where you intend to travel concerning restrictions for propane bottles and equipment.

**WARNING: The propane service valve must be shut off while traveling. Failure to comply may result in a fire or explosion if involved in an accident.**

**NOTE:** Starcraft RV, Inc. is not responsible for personal injury or property damage resulting from improperly maintained propane appliances and systems.

# Pre-Travel Check

| AREA | BE SURE |
|---|---|
| **Interior** | |
| Lights | Off |
| Vents, Doors, & Drawers | Closed & secured |
| Refrigerator & Ice Box | Secured with travel lock |
| Loose Items | Stored or lashed down |
| **Exterior** | |
| Tires* | Properly inflated & in good condition |
| Wheel Lug Nuts* | Tight |
| Lights - both vehicles* | Brake, turning, headlights, and taillights all work |
| Hoses (drain & fill) | Disconnected & stored, caps secured |
| Power Cord | Disconnected & stored |
| Step* | Pushed in |
| Stabilizing Jacks* | Retracted |
| Access doors & Hatches* | Closed & locked |
| Propane Bottle(s) | Connections secured & service valve closed |
| **Hitching & Coupling** | |
| Hitch* | Secure |
| Safety Chains* | Properly crossed & attached |
| Break-Away Switch Connector* | Properly attached |
| Front Jack* | Raised |
| Mirrors* | Properly adjusted |

*** NOTE:** Whenever you depart from home, a gas station, rest area or campsite, take some time to carefully perform these specific checks.

# Trip Preparation

## Sanitize Water System

To assure complete sanitation of your drinking water supply, you should cleanse a new system or one that may have been contaminated. Read *Water Systems*, page 19, and then proceed as follows:

1. Mix a solution of household bleach (5% sodium hypochlorite) and water (1/4 cup of bleach per 1 gallon of water for each 15 gal. tank capacity).
2. Pour this mixture into your water tank, completely filling the tank and water heater. Open each faucet until water flows steadily, then turn off all faucets.
3. Allow the solution to work for three hours.
4. Drain and thoroughly flush the system with fresh water (4-6 flushes).

**WARNING: DO NOT use contaminated system until it has been cleaned and thoroughly flushed (4 - 6 flushes) with water. Keep children away from unit until the water is safe to drink.**

**NOTE:** If the chlorine taste or odor lingers, pour one quart of vinegar mixed with five gallons of water into the tank. Drive a bit and let the vehicle motion agitate this solution; allow to sit a day or two. Then drain, fill, and flush again with fresh water.

## Frame & Running Gear

Check the wheel lug nuts before your first trip and again after 25, 100, and 500 miles, and every 500 miles thereafter. They should be kept torqued to 50 to 75 ft./LBS. Aluminum wheels should be torqued to 85 ft./LBS.

Check the tire inflation against the manufacturers recommendations, as shown on the tire sidewall. Also check the rims and hubs for road damage, and check jack every 250 miles.

## Spare Bulbs

The bulbs used in the clearance lights, taillights, and interior lights are standard automotive types usually available at service stations and auto parts stores. You may wish to purchase spares in advance to avoid an inconvenience later. Use the size specified.

Side Marker .....194

Tail & Turn .....3157

Dome Light .....921

Bunk Light ..... 212-2

Patio .....921

See your towing vehicle owner's manual for the listing of light bulbs and fuses.

# Trailering

## Driving

You may need a little experience to gain assurance and become familiar with the feel of towing a trailer. Practice accelerating, turning, backing, and braking at home under favorable conditions before you take a trip. By doing this, you will get an idea of the effect of the additional weight and length of your unit. This will help you to remember to allow greater distances for safe passing and stopping.

Some states require slow moving vehicles on two-way roads to pull off at the first opportunity whenever several vehicles have lined up behind them, waiting to pass. This is a courtesy that might protect you from impatient drivers who may pass you without enough room.

Driving tips:

1. Move into traffic slowly and accelerate gradually.
2. Stay in the right lane as much as possible. Allow faster vehicles the right of way.
3. Before passing a slower vehicle, be certain that you have sufficient speed and highway space available to safely complete the maneuver. Signal all lane changes. Allow enough room between you and the vehicle you pass before returning to the right lane.
4. When turning, swing wide of the curb. The unit will turn closer to the curb than your car.
5. Shift to a lower gear when either ascending or descending a hill or steep grade.
6. Avoid sudden stops.

Learn all you can about the Starcraft RV, Inc. RV you are planning to purchase. Get the facts about the actual trailer length, width, unloaded weight with options, GVWR and cargo carrying capacity. These are valuable pieces of information you should know when choosing an RV. This information is available in the manufacturer's sales literature or from the cargo carrying capacity label located in each trailer.

Verify the towing capacity of your tow vehicle. If you don't know, or aren't sure, ask your automotive dealership. Be sure to match its tow rating to the loaded (not dry) weight of your trailer (GVWR). Include the weight of water, LP gas, additional accessories, clothing, food and gear. Be sure the weight of the tow vehicle plus the weight of your trailer **do not** exceed the GVWR of the tow vehicle.

## Braking & Emergency Stops

Anticipate stops well in advance so you can avoid panic stops which can cause your camper to jackknife, resulting in possible accident and injury.

When adjusted correctly, the brake controller in your tow vehicle should apply the camper brakes, if so equipped, slightly before the brakes on the tow vehicle take effect. This will avoid the tendency of the camper to jackknife in emergency braking situations or on slick pavement.

## Runaway Camper

In the event your camper should disconnect from the hitch on the tow vehicle, reduce your speed slowly and edge over into the shoulder as soon as you can do so safely. Properly connected safety chains will keep the camper connected to the tow vehicle.

## Swaying

If your trailer starts to sway or fishtail, DO NOT let up on the gas or apply the car brakes. Avoid quick corrective steering changes. Keep a steady or slightly increased pressure on the gas pedal (gently apply the trailer brake, if so equipped) to gain control, then gradually slow down. Winds or passing vehicles can cause some sway, but if it continues, follow the procedure above to regain control and carefully pull off the road and check for the cause, such as: low tire pressure, loose wheel lug nuts, improper loading (rear heavy), car suspension or alignment, or tow vehicle inadequacy.

## Grades

Reducing your speed, using a lower transmission range or shifting to a lower gear will assist in braking and uphill it will help prevent the engine from overheating. It's best not to park on a grade, but if it is necessary, apply the brakes and have someone place wheel blocks against the trailer tires. Then release the brakes slowly until the unit is stopped by the blocks. Apply the parking brake and place the transmission in park (or in gear if manual transmission).

## Backing

This is a skill best learned from experience; perhaps in an empty parking lot. Place yourself so your approach will favor your left view; campsite to the left, for example. Station someone at the rear of the unit to make sure everything is clear and help guide you. Place your hand at the bottom of the steering wheel and move it in the direction you want the trailer to go. If the trailer starts to jackknife, stop, pull forward enough to align the units, and try again.

When backing into your campsite, remember to also watch above for branches and limbs that could harm your unit.

## Tire Change

A tire change on the road may present extra problems and distractions. Be careful. Turn on the hazard warning flashers and set up flares or warning lights. Block the opposite tire. When raising the trailer, use a scissor or hydraulic type jack on a wood block directly under the main beam just behind the axle. **DO NOT** use a bumper jack.

If the trailer must be left on the jack while you get the tire repaired, place a block, or something more solid and substantial than the jack, next to or near the jack, directly under the frame main beam. Lower the jack, putting most of the trailer weight on the block. **BLOCK THE TRAILER WHEELS BEFORE YOU UNHITCH.**

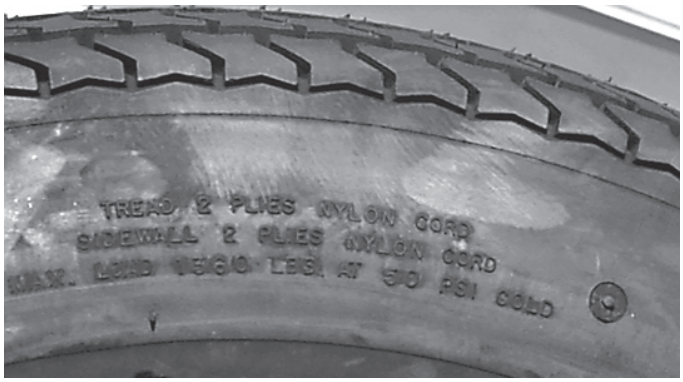



Fig. 6. Tire capacity and pressure statement.

Before jacking up the trailer, loosen all the wheel lug nuts. Jack up the trailer until the wheel spins freely. Remove the wheel lug nuts and the wheel and tire. Remove the center cap from the wheel and set it in the new wheel. Place the new wheel and tire on the hub. Hand tighten lug nuts being careful to center the countersunk wheel holes on the chamfered lug nuts. Lightly seat the lug nuts with the lug wrench. Lower trailer on to ground. Tighten wheel lug nuts to 50-75 foot pounds in the alternate pattern 1,3,5,2,4, 1,3,2,4 or 1, 3, 5, 2, 4, 6. Tighten to 50-75 foot pounds on 12″ wheels and 13″ wheels and 90-120 foot pounds on 14″ wheels and 15″ wheels.

**REMEMBER,** after changing wheels it is very important to check the wheel lug nuts for tightness at 25, 100, 500 and every 500 miles thereafter to assure tightness. See also the *Service Interval Chart* on page 36.

**DO NOT** return a tire to your Starcraft RV, Inc. Dealer or to Starcraft RV, Inc. Tires are warranted separately by each tire manufacturer. Contact the tire manufacturer or his authorized dealer. Check the tire warranty in the Starcraft RV, Inc. Owners Packet that came with your unit.

## Tires

Proper tire inflation is extremely important. Pressures for trailer tires are higher than car tires. The correct pressure for any tire is stated on the tire sidewall. Generally, the capacity of the tire is stated in pounds followed by the required air pressure as PSI. Following are typical capacities and pressures.

| | | |
|---|---|---|
| 5.30 x12 | load range B | 840# @ 55PSI |
| 5.30 x12 | load range C | 1045# @ 80PSI |
| B78-13 | load range B | 1065# @ 35PSI |
| B78-13 | load range C | 1315# @ 50PSI |
| ST175 80D 13C | load range C | 1360# @50 PSI |
| ST185 80D 13C | load range C | 1480# @50 PSI |
| LT235/75R15 | load range C | 1895# @50 PSI |

Trailer cargo carrying capacities are based on tire capacities. However, **DO NOT** underinflate a tire because you are underloaded.

Regularly check the tire air pressure when the tires are cold. The tire pressure may increase due to heat generated while traveling. **DO NOT** bleed the air from a hot tire. Under inflated tires decrease the load limit, tend to sway, shorten tread life, and can run hot. Overinflating causes a bouncy, rough ride that increases shock loads on all equipment and contents. Annual tire and wheel balancing can help give better tire mileage.

Tires should be inspected regularly. Check for uneven wear, road damage, foreign objects, bulging, or peeling.

Replace a tire when it is worn to 1/16″ depth in two or more adjacent grooves, or to the level of the tread indicators molded into the bottom of the tread grooves.

New camper tires should be of the same size, ply rating, and load range as the tires they replace, and they should be designated for trailer service.

## Wheel Lug Nuts

Before towing the camper, make sure that the wheel lug nuts are tight. On a trip, check the wheel lug nuts frequently and tighten them whenever necessary. See *Service Interval Chart*, page 36 and *Tire Change*, page 13. Before using your new camper for the first time, the wheel lug nuts should be torqued with a torque wrench by either you or your dealer. Twelve and thirteen inch wheel lug nuts should be torqued to 50 to 75 ft. lbs., fourteen and fifteen inch wheel lug nuts should be torqued at 90 to 120 ft. lbs. Wheels that come off, or bolts that break because they are loose, are not a warranty matter. Refer to the *Axle Manufacture Operation, Maintenance and Service Manual* in your Starcraft RV, Inc. Owner's Packet.

## Federal Information Sticker

A (federally required) sticker, Fig. 6A which is located on the roadside frame of the camping trailer lists the unit serial number and the gross vehicle weight rating (GVWR) for a specific tire size. Weight limits for the frame and axle are also listed.

## Load Limits and Weight Distribution

The tires, axle, and the hitch support the entire weight of the trailer. For safety, and to prevent damage to these parts of the camper, maximum load limits have been established for each Starcraft RV, Inc. camper. These limits are published on the **INFORMATION STICKER**. Fig. 6B, Damage or accident caused by overloading or improper loading will void any and all portions of your camper's warranty.

When loading for a trip, distribute the weight of loose items evenly around the inside of the camper. Heavy objects should be stored at floor level and secured to prevent shifting and possible damage to the camper. Assign permanently carried loose items a fixed storage area.

**Have your RV weighed periodically at a public scale to determine the proper load distribution.** Keep in mind that individual scales will operate differently. The surroundings of the scale need to be adequate to accommodate weighing each side of your RV.

### TO WEIGH YOUR TOW VEHICLE AND RV

**⚠WARNING**

**Total weight of your tow vehicle and RV must not exceed the GCWR.** Do not assume that you can tow a RV that happens to be within the capacity of the tow vehicle hitch. By doing so, you may exceed the total GCWR of your tow vehicle and RV towing combination.

**⚠WARNING**

It is important to redistribute the load to avoid component failure as well as to improve the handling characteristics of the vehicle.

Read through all the weighing instructions before you begin. If you have further questions, consult with your RV dealer or the scale operator. Your RV must be weighed fully loaded (that is with food, clothing, fuel, water, propane, supplies, etc).

1. Weigh the RV including the tongue weight, while detached from the tow vehicle. This actual overall weight must be less than or equal to the GVWR for safe operation. If the overall weight is greater than the GVWR, some contents must be removed until the actual overall weight is less than or equal to GVWR.

2. Hitch the RV to your tow vehicle. Weigh the RV and the tow vehicle to determine the GCW. Make sure that this rating is less than or equal to the GCWR as specified by the manufacturer of your tow vehicle. If this overall weight is greater than the GCWR, some contents must be removed to bring the combination into compliance with the listed ratings.

3. Weigh the RV while attached to but excluding the tow vehicle. This will result in the actual weight that is exerted on all of the RV tires. This weight may be subtracted from the overall RV GVWR to determine the actual "tongue" weight.

## TRAILER WEIGHT INFORMATION

VIN OR SERIAL NUMBER 1SAAS01F681AC3024 MODEL 2102 STARCRAFT CAMPING TRAILER

GVWR (GROSS VEHICLE WEIGHT RATING) is the maximum permissible weight of this trailer when fully loaded. It includes all weight at the trailer axle(s) and tongue or pin.

UVW (Unloaded Vehicle Weight) is the total weight of this trailer as manufactured at the factory. It includes all weight at the trailers axle(s) and tongue or pin. It applicable, it also includes full generator fluids, including fuel, engine oil, and coolants.

CCC (Cargo Carrying Capacity) is equal to GVWR minus each of the following: UVW, full fresh (potable) water weight (including water heater),and full propane gas weight.

| CARGO CARRYING CAPACITY (CCC) COMPUTATION | POUNDS | KILOGRAMS |
|---|---|---|
| GVWR | 2820 | 1279 |
| **Minus UVW | 2022 | 917 |
| Minus fresh water weight of 25 gallons @ 8.3 lbs/gal. | 208 | 94 |
| Minus propane weight of 5 gallons @ 4.2 lb/gal | 20 | 9 |
| *CCC for this trailer | 570 | 259 |

* Dealer installed equipment will reduce CCC

** Calculated using average vehicle weights

**CONSULT OWNER MANUAL(S) FOR SPECIFIC WEIGHING INSTRUCTIONS AND TOWING GUIDELINES**

SAMPLE

**Fig. 6B**

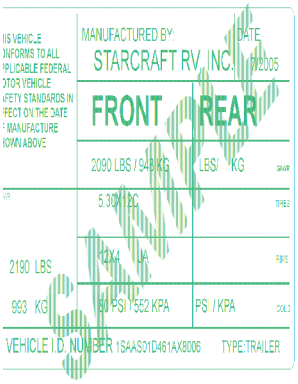



**Fig. 6A**

**4. With the RV still attached to the tow vehicle, weigh each wheel position separately to ensure each tire is not overloaded.**

**TO DETERMINE THE WHEEL POSITION WEIGHT**

**5. Pull the RV onto the scale so only one tire is on the scale. Record the weight. Your RV must remain as level as possible on the scale (even though an axle of side is not physically on the scale). Obviously, to obtain the side-to-side weights, there must be enough space on either side of the scale to accommodate the RV being partially off the scale.**

**6. To calculate the opposite side of the RV wheel position weight, subtract the first side's weight from the weight determined in step #3.**

**If there is a difference in the weights on one side of the vehicle as compared to weights on the other side, components (tires, wheels, brakes, springs, etc.) on the heavier side could be overloaded, even though the total axle load is within the GAWR. It is important to redistribute the load to avoid component failure, improve the handling characteristics of the tow vehicle and not void your camper's warranty.**

**With these actual weights, it is now possible to compare them against the Trailer Weight Information label weight ratings to ensure you are below the posted minimum ratings.**

## Weight Distribution & Rating Definitions:

**Cargo carrying capacity for your unit is defined on a weight label placed in your unit. Refer to the label contained in your unit for specific weight information pertaining to your unit. This weight label is affixed on the inside of a cabinet door.**

**NOTE: While every effort is made to provide an accurate weight, it is possible that the weight of your specific unit may vary from the weight shown on the label.**

**Gross Axle Weight Rating (GAWR) – The value specified by the vehicle manufacturer as the maximum load carrying capacity of a single axle system, as measured at the tire ground interfaces.**

**Gross Combination Weight Rating (GCWR) – Means the maximum permissible loaded weight of the fully loaded towing vehicle including passengers (for motorized products 150 pounds each), all cargo, fluids, etc., plus the weight of the fully loaded towed vehicle.**

**Gross Vehicle Weight Rating (GVWR) – Means the maximum permissible weight of the trailer. The GVWR is equal to or greater than the sum of the unloaded vehicle weight plus the net carrying capacity.**

**Unloaded Vehicle Weight (UVW) – Means the weight of the trailer as built at the factory. If applicable, it includes full generator fuel, engine oil, and coolants. The UVW does not include cargo, fresh water, propane, or dealer installed accessories.**

**Net Carrying Capacity (NCC) – Means the maximum weight of all personal belongings: food, fresh water, propane, tools, dealer installed accessories, etc., that can be carried by the trailer. NCC is equal to or less than GVWR minus UVW Tongue or Hitch Weight.**

**Following are a couple simple formulas to express the above:**

**UVW + NCC = GVWR**

**GVWR - UVW = NCC**

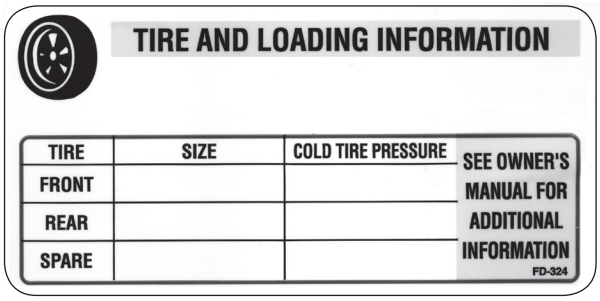
# Tire Safety

**NHTSA Hotline Number: 1-888-327-4236**

This portion of the Owner's Manual contains tire safety information as required by 49 CFR 575.6.

Section 1, based in part on the National Highway Traffic Safety Administration's Brochure entitled "Tire Safety-Everything Rides On It," contains the following items:

- Tire labeling, including a description and explanation of each marking on the tires, and information about the DOT Tire Identification Number (TIN). (See sample below.)




- Recommended tire inflation pressure, including a description and explanation of:
  - A. Cold inflation pressure
  - B. Vehicle Placard and location on the vehicle
  - C. Adverse safety consequences of under inflation (including tire failure)
  - D. Measuring and adjusting air pressure for proper inflation.
- Tire Care, including maintenance and safety practices.
- Vehicle load limits, including a description and explanation of the following items:
  - A. Locating and understanding the load limit information, total load capacity, and cargo capacity
  - B. Calculating total and cargo capacities with varying seating configurations, including quantitative examples showing/illustrating how the vehicle's cargo and luggage capacity decreases as combined number and size of occupants increases. This item is also discussed in Section 3
  - C. Determining compatibility of tire and vehicle load capabilities.
  - D. Adverse safety consequences of overloading on handling and stopping on tires.

Section 2 contains "Steps for Determining Correct Load Limit"

Section 3 contains a Glossary of Tire Terminology, including "cold inflation pressure", "maximum inflation pressure", "recommended inflation pressure", and other non-technical terms.

## SECTION I

The National Traffic Safety Administration (NHTSA) has published a brochure (DOT HS 809 361) that discusses all aspects of Tire Safety, as required by CFR 575.6. This brochure is reproduced in part below. It can be obtained and downloaded from NHTSA, free of charge, from the following web site:

http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires_index.html

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires. These actions, along with other care and maintenance activities, can also:

- Improve vehicle handling
- Help protect you and others from avoidable breakdowns and accidents
- Improve fuel economy
- Increase the life of your tires.

This booklet presents a comprehensive overview of tire safety, including information on the following topics:

- Basic tire maintenance
- Uniform Tire Quality Grading System
- Fundamental characteristics of tires
- Tire safety tips.

Use this information to make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of the flat tire or other failure.

### Safety First – Basic Tire Maintenance

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Underinflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as mentioned above, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure, observe tire and vehicle load limits, avoid road hazards, and regularly inspect your tires.

### Finding Your Vehicle's Recommended Tire Pressure and Load Limits

Tire information placards and vehicle certification labels contain information on tires and load limits. These labels indicate the vehicle manufacturer's information including:

- Recommended tire size
- Recommended tire inflation pressure
- Vehicle capacity weight (VCW-the maximum occupant and cargo weight a vehicle is designed to carry)
- Front and rear gross axle weight ratings (GAWR – the maximum weight the axle systems are designed to carry).

Both placards and certification labels are permanently attached to the trailer on the forward half of the left side, and are easily readable from outside the vehicle without moving any part of the vehicle. You can also find the recommended tire pressure and load limit for your vehicle in the vehicle owner's manual.

### Understanding Tire Pressure and Load Limits

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure measured in pounds per square inch (psi) – a tire requires to be properly inflated. (You will also find this number on the vehicle information placard expressed in kilopascals (kPa), which is the metric measure used internationally.)

Vehicle manufacturers determine this number based on the vehicle's design load limit, that is, the greatest amount of weight a vehicle can safely carry and the vehicle's tire size. The proper tire pressure for your vehicle is referred to as the "recommended cold inflation pressure". (As you will read below, it is difficult to obtain the recommended tire pressure if your tires are not cold.)

Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the "maximum permissible inflation pressure" on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

## Checking Tire Pressure

It is important to check your vehicle's tire pressure at least once a month for the following reasons

- Most tires may naturally lose air over time
- Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb when parking
- With radial tires, it is usually not possible to determine underinflation by visual inspection.

For convenience, purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.

The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper psi when a tire is cold. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours. When you drive, your tires get warmer, causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

## Steps for Maintaining Proper Tire Pressure

- Step 1: Locate the recommended tire pressure on the vehicle's tire information placard, certification label, or in the owner's manual
- Step 2: Record the tire pressure of all tires
- Step 3: If the tire pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure
- Step 4: If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. These "missing" pounds of pressure are what you will need to add
- Step 5: At a service station, add the missing pounds of air pressure to each tire that is underinflated
- Step 6: Check all the tires to make sure they have the same air pressure (except in cases in which the front and rear tires are supposed to have different amounts of pressure).

If you have been driving your vehicle and think that a tire is underinflated, fill it to the recommended cold inflation pressure indicated on your vehicle's tire information placard or certification label. While your tire may still be slightly underinflated due to the extra pounds of pressure in the warm tire, it is safer to drive with air pressure that is slightly lower than the vehicle manufacturer's recommended cold inflation pressure than to drive with a significantly underinflated tire. Since this is a temporary fix, don't forget to recheck and adjust the tire's pressure when you can obtain a cold reading.

## Tire Size

To maintain tire safety, purchase new tires that are the same size as the vehicle's original tires or another size recommended by the manufacturer. Look at the tire information placard, the owner's manual, or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult with the tire dealer.

## Tire Tread

The tire tread provides the gripping action and traction that prevent your vehicle from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe and should be replaced when the tread is worn down to 1/16 of an inch. Tires have built-in treadwear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear "even" with the outside of the tread, it is time to replace your tires. Another method for checking tread depth is to place a penny in the tread with Lincoln's head upside down and facing you. If you can see the top of Lincoln's head, you are ready for new tires.

## Tire Balance and Wheel Alignment

To avoid vibration or shaking of the vehicle when a tire rotates, the tire must be properly balanced. This balance is achieved by positioning weights on the wheel to counterbalance heavy spots on the wheel-and-tire assembly. A wheel alignment adjusts the angles of the wheels so that they are positioned correctly relative to the vehicle's frame. This adjustment maximizes the life of your tires. These adjustments require special equipment and should be performed by a qualified technician.

## Tire Repair

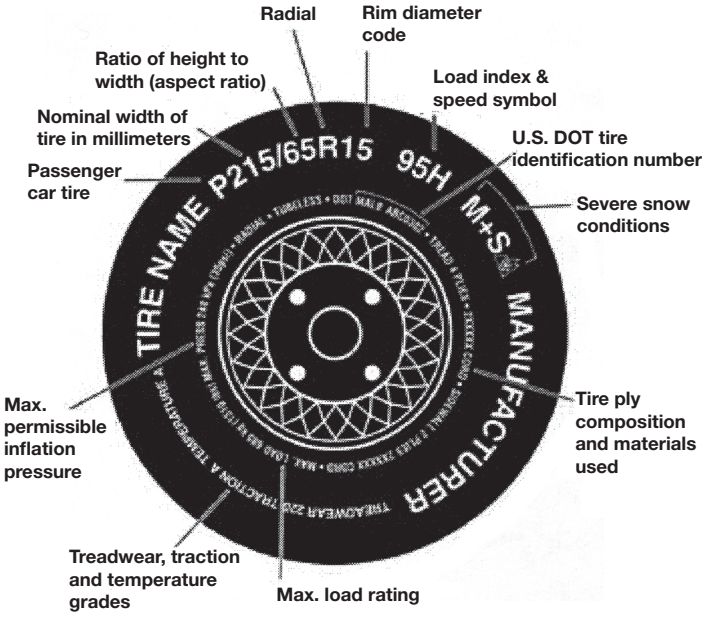
The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

## Tire Fundamentals

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

## Information on Passenger Vehicle Tires

Please refer to the diagram below:




**P** – The "P" indicates the tire is for passenger vehicles.

**NOTE:** Passenger car tires are not recommended for use on trailers, because the capacity ratings are not marked on the side walls of these tires. In the event a passenger car tire is used, the capacity must be derated by 10%.

**Next Number** – This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.

**Next Number** – This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width. Numbers of 70 or

lower indicate a short sidewall for improved steering response and better overall handling on dry pavement.

**R** – The "R" stands for radial. Radial ply construction of tires has been the industry standard for the past 20 years.

**Next Number** – This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel diameter.

**Next Number** – This two- or three-digit number is the tire's load index. It is a measurement of how much weight each tire can support. You may find this information in your owner's manual. If not, contact a local tire dealer. Note: You may not find this information on all tires because it is not required by law.

**M+S** – The "M+S" or "M/S" indicates that the tire has some mud and snow capability. Most radial tires have these markings.

**Speed Rating** – The speed rating denotes the speed at which a tire is designed to be driven for extended periods of time. The ratings range from 99 miles per hour (mph) to 186 mph. These ratings are listed below. Note: You may not find this information on all tires because it is not required by law.

| Letter Rating | Speed Rating |
|---|---|
| Q | 99 mph |
| R | 106 mph |
| S | 112 mph |
| T | 118 mph |
| U | 124 mph |
| H | 130 mph |
| V | 149 mph |
| W | 168* mph |
| Y | 186* mph |

* For tires with a maximum speed capability over 149 mph, tire manufacturers sometimes use the letters ZR. For those with a maximum speed capability over 186 mph, tire manufacturers always use the letters ZR.

**U.S. DOT Tire Identification Number** – This begins with the letters "DOT" and indicates that the tire meets all federal standards. The next two numbers or letters are the plant code where it was manufactured, and the last four numbers represent the week and year the tire was built. For example, the numbers 3197 means the 31st week of 1997. The other numbers are marketing codes used at the manufacturer's discretion. This information is used to contact consumers if a tire defect requires a recall.

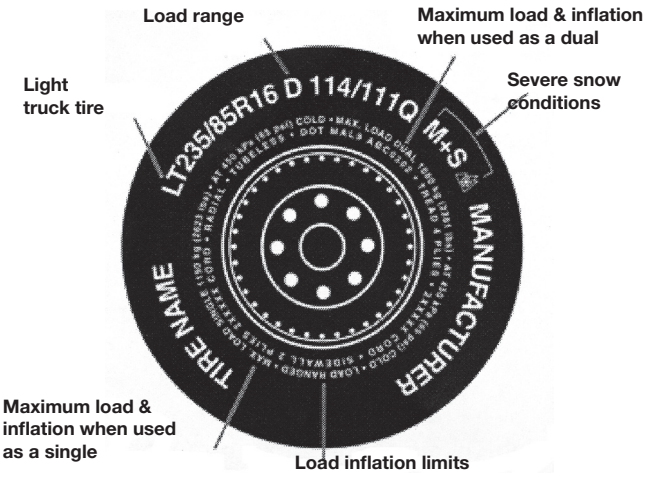
**Tire Ply Composition and Materials Used** – The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.

**Maximum Load Rating** – This number indicates the maximum load in kilograms and pounds that can be carried by the tire.

Maximum Permissible Inflation Pressure – This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

## Additional Information on Light Truck Tires

Please refer to the following diagram:




Tires for light trucks have other markings besides those found on the sidewalls of passenger tires.

**LT** – The "LT" indicates the tire is for light trucks or trailers.

**ST** – An "ST" is an indication the tire is for trailer use only.

**Max. Load Dual kg (lbs) at kPa (psi) Cold** – This information indicates the maximum load and tire pressure when the tire is used as a dual; that is, when four tires are put on each rear axle (a total of six or more tires on the vehicle).

**Max. Load Single kg (lbs) at kPa (psi) Cold** – This information indicates the maximum load and tire pressure when the tire is used as a single.

**Load Range** – This information identifies the tire's load-carrying capabilities and its inflation limits.

## Vehicle Load Limits

Determining the load limits of a vehicle includes more than understanding the load limits of the tires alone.

On a trailer, there is a Federal certification label located on the forward half of the left (road) side of the unit.

The certification label will indicate the vehicle's gross vehicle weight rating (GVWR). This is the most weight the fully loaded vehicle can weigh. It will also provide the gross axle weight rating (GAWR). This is the most a particular axle can weigh. If there are multiple axles, the GAWR of each axle will be provided.

In the same location as the certification label described above, there is a vehicle placard. This placard provides tire and loading information. In addition, this placard will show a statement regarding maximum cargo capacity.

## Cargo Capacity

Cargo can be added to the vehicle, up to the maximum weight specified on the placard and, the total weight of the fully loaded vehicle cannot exceed the stated GVWR or GAWR.

Water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the RV before it is loaded with cargo and is not considered part of the disposable cargo load. Water, however, is a cargo weight and is treated as such. If there is a fresh water storage tank of 100 gallons, this tank, when filled, would weigh about 800 pounds. If more cargo is being transported, water can be off-loaded to keep the total amount of cargo added to the vehicle within the limits of GVWR so as not to overload the vehicle. Understanding this flexibility will allow you, the owner, to make choices that fit your travel and camping needs.

When loading your cargo, be sure it is distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low as close to the axle positions as reasonable. Too many items on one side may overload a tire. The best way to know the actual weight of the vehicle is to weigh it at a public scale. Talk to your RV dealer to discuss the weighing methods needed to capture the various weights related to the RV. This would include weights for the following: axles, wheels, hitch or pin (in the case of a trailer) and total weight.

## How Overloading Affects Your RV and Tires

The results of overloading can have serious consequences for passenger safety. Too much weight on your vehicle's suspension system can cause spring, shock absorber, or brake failure, handling or steering problems, irregular tire wear, tire failure or other damage.

An overloaded vehicle is hard to drive and hard to stop. In case of serious overloading, brakes can fail completely, particularly on steep hills. The load a tire will carry safely is a combination of the size of tire, its load range, and corresponding inflation pressure.

Excessive loads and/or underinflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure.

It is the air pressure that enables a tire to support the load, so proper inflation is critical. Since RVs can be configured and loaded in many ways, air pressures must be determined from actual loads (determined by weighing) and taken from the load and inflation tables provided by the tire manufacturer. These air pressures may differ from those found on the certification label. However, they should never exceed the tire limitation for load or air pressure. If you discover that your tires cannot support the actual weights, the load will need to be lightened.

## Tire Safety Tips

### Preventing Tire Damage

- Slow down if you have to go over a pothole or other object in the road
- Do not run over curbs or other foreign objects in the roadway, and try not to strike the curb when parking.

### Tire Safety Checklist

- Check tire pressure regularly (at least once a month), including the spare
- Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma
- Remove bits of glass and foreign objects wedged in the tread
- Make sure your tire valves have valve caps
- Check tire pressure before going on a long trip
- Do not overload your vehicle. Check the Tire Information and Loading Placard or User's Manual for the maximum recommended load for the vehicle.

# SECTION 2 [Trailers only]

## Steps for Determining Correct Load Limit

1. Locate the statement. The weight of cargo should never exceed XXX kg or XXX lbs on your vehicle's placard
2. This figure equals the available amount of cargo and luggage load capacity
3. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity.

# SECTION 3

## Glossary of Tire Terminology

**Accessory weight** – The combined weight (in excess of those standard items which may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

**Bead** – The part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.

**Bead separation** – This is the breakdown of the bond between components in the bead.

**Bias ply tire** – A pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the center line of the tread.

**Carcass** – The tire structure, except tread and sidewall rubber which, when inflated, bears the load.

**Chunking** – The breaking away of pieces of the tread or sidewall.

**Cold inflation pressure** – The pressure in the tire before you drive.

**Cord** – The strands forming the plies in the tire.

**Cord Separation** – The parting of cords from adjacent rubber compounds.

**Cracking** – Any parting within the tread, sidewall, or inner liner of the tire extending to cord material.

**CT** – A pneumatic tire with an inverted flange tire and rim system in which the rim is designed with rim flanges pointed radially inward and the tire is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tire.

**Curb weight** – The weight of motor vehicle with standard equipment, including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.

**Extra load tire** – A tire designed to operate at higher loads and at higher inflation pressure than the corresponding standard tire.

**Groove** – The space between two adjacent tread ribs.

**Gross Vehicle Weight Rating (GVWR)** – The maximum permissible weight of this fully loaded vehicle.

**Gross Axle Weight Rating (GAWR)** – The value specified as the load carrying capacity of a single axle system, as measured at the tire-ground interfaces.

**Hitch Weight** – The vertical trailer load supported by the hitch ball.

**Innerliner** – The layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

**Innerliner separation** – The parting of the innerliner from cord material in the carcass.

**Intended outboard sidewall** – The sidewall that contains a white-wall, bears white lettering or bears manufacturer, brand, and/or model name molding that is higher or deeper than the same molding on the other sidewall of the tire or the outward facing sidewall of an asymmetrical tire that has a particular side that must always face outward when mounted on a vehicle.

**Light truck (LT) tire** – A tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.

**Load rating** – The maximum load that a tire is rated to carry for a given inflation pressure.

**Maximum load rating** – The load rating for a tire at the maximum permissible inflation pressure for that tire.

**Maximum permissible inflation pressure** – The maximum cold inflation pressure to which a tire may be inflated.

**Maximum loaded vehicle weight** – The sum of curb weight, accessory weight, vehicle capacity weight, and production options weight.

**Measuring rim** – The rim on which a tire is fitted for physical dimension requirements.

**Non-pneumatic rim** – A mechanical device which, when a non-pneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separably, to the wheel center member and upon which the tire is attached.

**Non-pneumatic spare tire assembly** – A non-pneumatic tire assembly intended for temporary use in place of one of the pneumatic tires and rims that are fitted to a passenger car in compliance with the requirements of this standard.

**Non-pneumatic tire** – A mechanical device which transmits, either directly or through a wheel or wheel center member, the vertical load and tractive forces from the roadway to the vehicle, generates the tractive forces that provide the directional control of the vehicle and does not rely on the containment of any gas or fluid for providing those functions.

**Non-pneumatic tire assembly** – A non-pneumatic tire, alone or in combination with a wheel or wheel center member, which can be mounted on a vehicle.

**Normal occupant weight** – This means 68 kilograms (150 lbs.) times the number of occupants specified in the second column of Table I of 49 CFR 571.110.

**Occupant distribution** – The distribution of occupants in a vehicle as specified in the third column of Table I of 49 CFR 571.110.

**Open splice** – Any parting at any junction of tread, sidewall, or innerliner that extends to cord material.

**Outer diameter** – The overall diameter of an inflated new tire.

**Overall width** – The linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.

**Pin Weight** – The vertical trailer load supported by the king pin of a fifth wheel hitch.

**Ply** – A layer of rubber-coated parallel cords.

**Ply separation** – A parting of rubber compound between adjacent plies.

**Pneumatic tire** – A mechanical device made of rubber, chemicals, fabric and steel or other materials that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.

**Production options weight** – The combined weight of those installed regular production options weighing over 2.3 kilograms (5 lbs.) in excess of those standard items which they replace, not previously considered in curb weight or accessory weight, including heavy duty brakes, ride levelers, roof rack, heavy duty battery, and special trim.

**Radial ply tire** – A pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the centerline of the tread.

**Recommended inflation pressure** – This is the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the Certification / VIN tag.

**Reinforced tire** – A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

**Rim** – A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

**Rim diameter** – This means the nominal diameter of the bead seat.

**Rim size designation** – This means the rim diameter and width.

**Rim type designation** – This means the industry of manufacturers' designation for a rim by style or code.

**Rim width** – This means the nominal distance between rim flanges.

**Section width** – The linear distance between the exteriors of the sidewalls of an inflated tire, excluding elevations due to labeling, decoration, or protective bands.

**Sidewall** – That portion of a tire between the tread and bead.

**Sidewall separation** – The parting of the rubber compound from the cord material in the sidewall.

**Test rim** – The rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.

**Tread** – That portion of a tire that comes into contact with the road.

**Tread rib** – A tread section running circumferentially around a tire.

**Tread separation** – Pulling away of the tread from the tire carcass.

**Treadwear indicators (TWI)** – The projections within the principal grooves designed to give a visual indication of the degrees of wear of the tread.

**Vehicle capacity weight** – The rated cargo and luggage load plus 68 kilograms (150 lbs.) times the vehicle's designated seating capacity.

**Vehicle maximum load on the tire** – The load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

**Vehicle normal load on the tire** – The load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight (distributed in accordance with Table I of CFT 49 571.110) and dividing by two.

**Weather side** – The surface area of the rim not covered by the inflated tire.

**Wheel center member** – In the case of a non-pneumatic tire assembly incorporating a wheel, a mechanical device which attaches, either integrally or separably, 0 to the non-pneumatic rim and provides the connection between the non-pneumatic rim and the vehicle; or, in the case of a non-pneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic tire and provides the connection between tire and the vehicle.

**Wheel-holding fixture** – The fixture used to hold the wheel and tire assembly securely during testing.

# Exterior Set-Up
## (non slideout models)

**Before setting up:** If a boat, bicycles, or any luggage is being transported, remove it from the roof carrier **BEFORE** raising the roof. Block the trailer wheels whenever you unhitch. **DO NOT** raise or lower the roof with the stabilizer jacks set. The jacks may induce some twist in the frame which could throw the lift system temporarily out of alignment. Raising or lowering the roof under these conditions could cause damage to the lifter system.

**REMEMBER:** The stabilizer jacks should not be used to level the camper. Release the roof latches BEFORE attempting to crank up the roof. **FAILURE TO DO SO WILL RESULT IN DAMAGE TO THE LIFTER SYSTEM,** which will not be covered by warranty.

**NOTE:** Canopy or add-a-room options should be attached to the camper before the roof is raised. Camping trailers equipped with awnings should have the poles and other hardware removed from the roof-mounted carrying case.

1. Position the trailer on a level spot and lower the dolly wheel jack until the dolly wheel touches the ground. Release the coupler and crank the jack down until the coupler is clear of the hitch ball. When setting up on soft ground, place a board under the dolly wheel.
2. Release the roof latches. See Fig. 7.

Fig. 7. Roof latch.

3. Slide the crank handle into the crank shaft and turn the crank handle clockwise until red gauge wire becomes tight. **DO NOT OVER-CRANK THE WINCH.**
4. After the roof has been raised, set the stabilizer jacks. The main corner jacks are BAL screw jacks which are crank operated. To operate the BAL screw jacks, simply place crank handle onto shaft and turn. To lower, turn clockwise. To retract, turn counter clockwise.
5. Find bed supports under bed mats. Hang front "U" bed supports on front wall, placing legs in A-frame bracket holes closest to front wall. Hang rear scissor supports on rear wall, placing legs in bumper slots. See Fig. 8, 9 and 10.

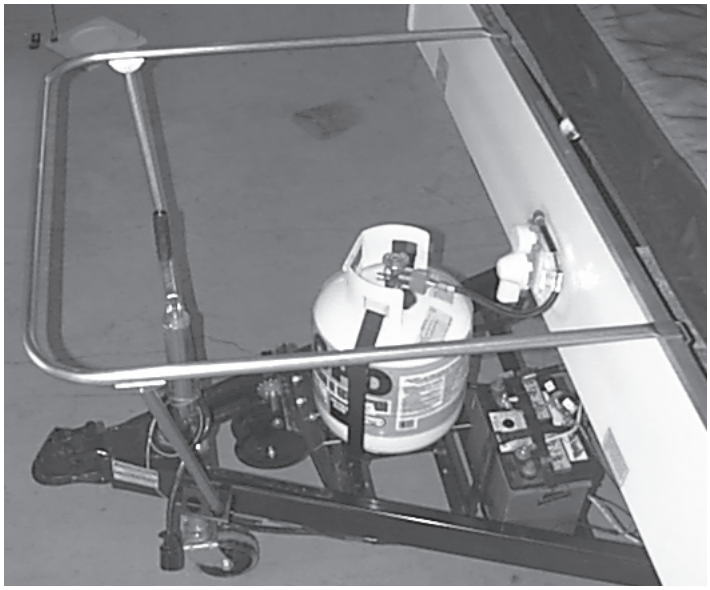


Fig. 8. Installing "U" bed support on front wall.

Fig. 9. Set up bed with braces in place.

Fig. 10. Rear bed braces.

6. Pull beds out. Install single tube supports on front beds using A-frame bracket hole toward coupler. Larger campers with 60″ beds on the rear will also have single tube supports.

**CAUTION: The bunk braces must be in place before pulling out the bunk. The bunk will not support itself. Damage to the slide mechanism could result.**

7. **Zip down the tent at the four lifters. The bunkend side panel goes between the lifter and the wall cap/bed slide moulding. Velcro the bunkend side panel to the wall cap/bed slide at the lifters. Wrap the lifter water covers around the lifter, and velcro to the tent side panel. See Figs. 11A & 11B.**

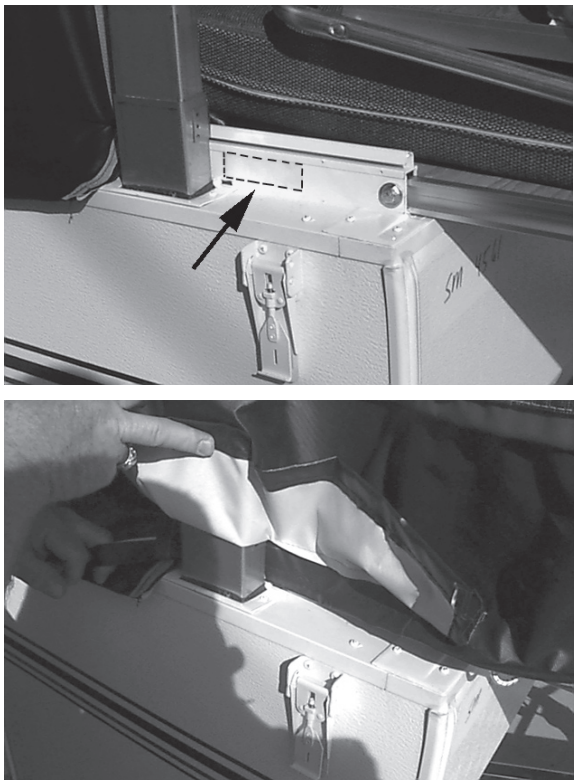
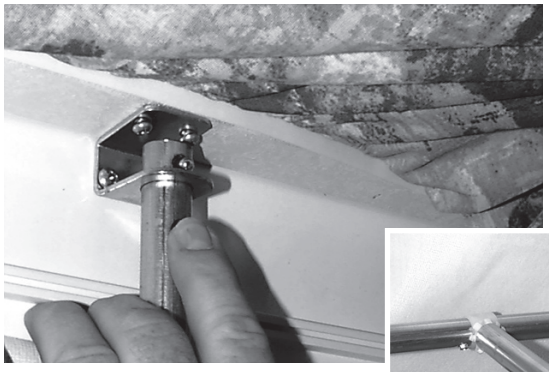


Fig. 11A and 11B. Velcro fastener on corners (on wall cap/bed slide molding).

8. **Wrap the bunkend side panels under the bed edges, hooking the shock cord loops around the metal retainers on the under side of the bed edges. See Fig. 12.**

Fig. 12. Using shock cord retainers on bottom of bunk.

9. **Inside the unit, in the bunkend, clip the overhead support pole onto the tent bow, which will be laying on the bed mat. Push the support pole and tent bow up and out, raising the bunkend. Insert the adjuster end of support into the bracket on the inside of the roof end board. Adjust the length of the support bar at the adjuster until the bunkend canvas is tight. See Figs. 13A, 13B & 14.**
10. **Release the screen door from the roof by turning the twist locks. Swing the door down to the lower door. Lift up and insert the tabs, found at the bottom of the screen door, into the notches located in the top of the door posts in the sidewalls. See Figs. 15A & 15B. At the top of the screen door, push the bifold hinge flat against the roof side board, positioning the two white turn buttons to come through the slots in the hinge. Turn the two turn buttons 90 degrees to hold the screen door against the roof.**
11. **Fasten the latch that holds the screen door and lower door together.**
12. **Attach the canvas to the screen door with the velcro strips.**



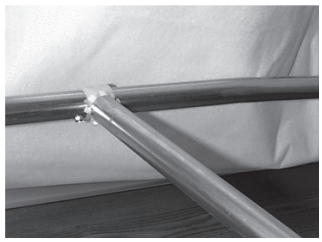
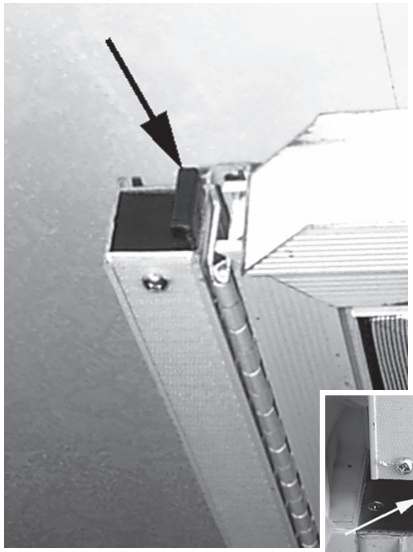


Fig. 13A & 13B. Roof bracket for tent pole (valance not shown for clarity).

Fig. 14.
Tent support bar.



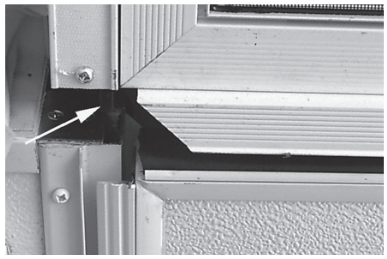


Fig. 15A & 15B.
Tab at bottom of screen door.

# Exterior Setup
## (slideout models)

Exterior setup of slideout model campers is the same as all others. See pages 14 &15. Set up of the slideout room is as follows:

1. Pull out the slideout until it stops.
2. Tuck slideout tent into tent retainer under the velcro strip and then press onto the velcro on both ends of slideout. See Fig. 16.
3. Inside the slideout tent, raise the bunkend tent in the same manner as the front and rear bunkends.

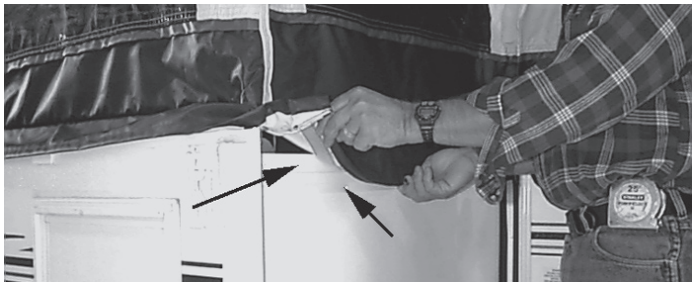


Fig. 16. Exterior slideout showing tent retention.

# Interior Set-Up

### Sink Cabinet

Fold-Over – Swing the cabinet into place on the base cabinet. See Fig. 18.

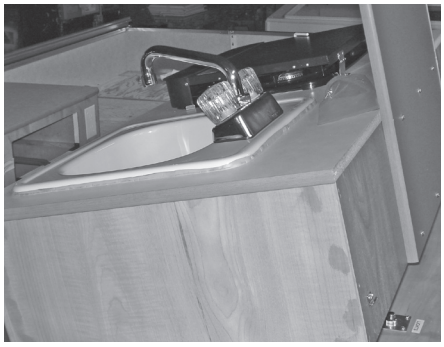


Fig. 18.
Fold-over Sink.

### Tables

**NOTE:** Store tables inside overnight and during bad weather.

All tables are of the freestanding type: unhook the retaining strap to free the legs, unfold and lock in position.

For travel, the table stows between the dinette seats, be sure that the table extrusion is inserted in the wall extrusion correctly.

### Beds

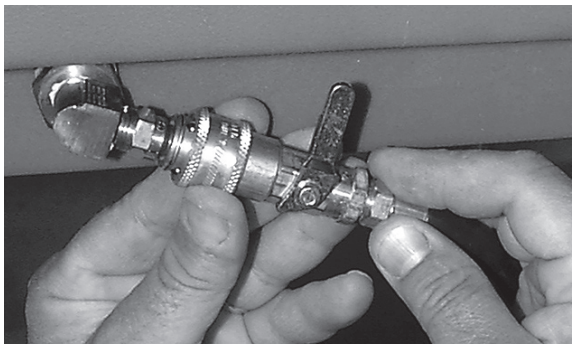
The bed ends on either end of the trailer are rated for approximately 1000 LBS.

**WARNING: DO NOT leave children unattended in the bunk ends. A child might work his way out between the bunk and the tent and become caught in the elastic strapping, or fall to the ground.**

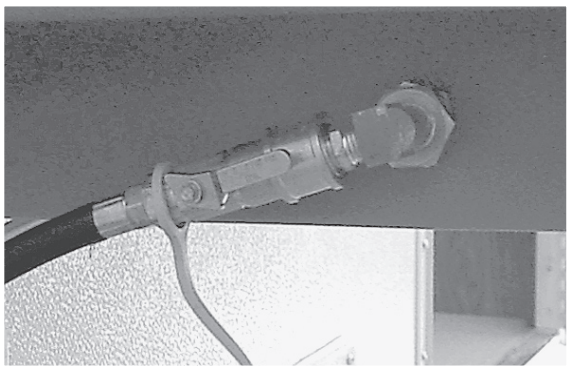
Aside from the bunk ends, other beds are made using either the tables or gaucho. The tables are placed on supports between the dinette seats. The seat back cushions are spread over the table.

### Carry-Out Range

A carry-out range is standard on some models. It can be used inside the camper, or outside, hanging on the exterior sidewall. A propane flex hose, with a quick disconnect, is provided at both locations. To make the propane connection, the shutoff handle must be at right angles to the coupler. See Figs. 19A & 19B. Pull the collar on the coupler toward the hose while inserting the male fitting on the stove box into the coupler. Once connected, push the collar back toward the range making the connection. Rotate the shutoff handle, making it parallel with the coupler, turning on the propane and locking the coupler. To remove, reverse this process.



Valve closed.



Valve open.

Figs. 19A & 19B.
Quick disconnects for carry-out range.

When used outside, the range hangs on an extrusion on the door side sidewall, to the rear of the door. The flex hose with the propane quick disconnect is found in a hatch, like the one used for the power cord. See Fig. 30.

For travel, stow the portable range inside on the floor. Depending on the model, a stove bracket, like the one on the outside of the camper, is provided on a cabinet front wall or dinette front. See Fig. 20.

A warning label has been located in the cooking area to remind you to provide an adequate supply of fresh air for combustion. Unlike homes, the amount of oxygen supply is limited due to the size of the camper. Proper ventilation when using the cooking appliance will avoid the dangers of asphyxiation. It is especially important that cooking appliances not be used for comfort heating as the danger for asphyxiation

is greater when the appliances are used for long periods of time. Also, see *Special Safety Procedures*, page 8.

**NOTE:** Store the range inside overnight and during bad weather.

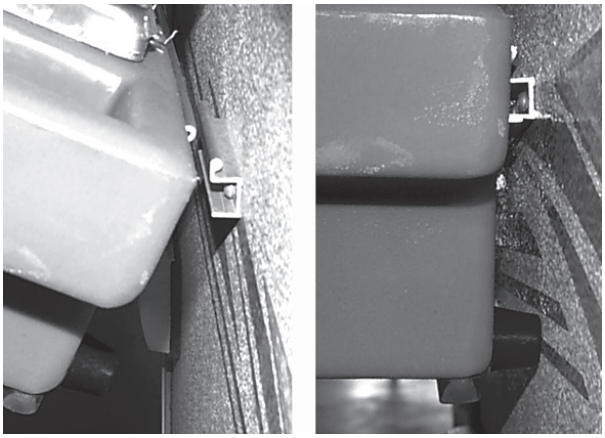


Fig. 20. Carry out range attached to outside of camper.

**⚠ WARNING**

**IT IS NOT SAFE TO USE COOKING APPLIANCES FOR COMFORT HEATING.**
**Cooking appliances need fresh air for safe operation.**

**Before operation:**
1. **Open overhead vent or turn on exhaust fan.**
2. **Open window.**

**FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.**

DD-26C

## Drape Retainer Cord Installation

To prevent the possibility of drapes entering flame area of range, install drapes as follows.

1. The drapes that have straps sewn to the bottom are to be hung behind the range area.
2. Thread the shock cord (A) through the loops on the drape strap (B).
3. Attach each end of the shock cord to the plastic pulley (C) mounted on the bed slide extrusion.

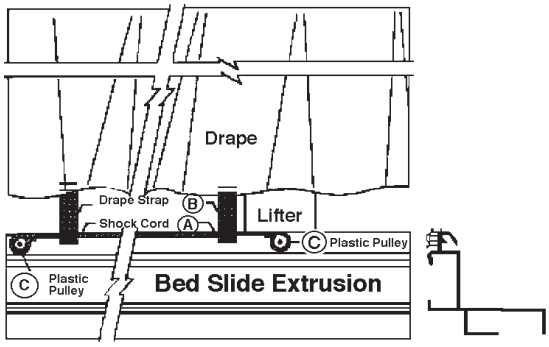



Diagram of drape retainer cord installation.

# Accessory Installation and Set-Up

## Step Operation

For single steps:

1. Lift front of step and pull outward to disengage the cross bar on the back of the step from the notch at the rear of the slots in the step side frames.
2. Slide step out until the cross bar on the back of the step hits the end of the slots in the step side frames at the front end. Lower front of step to engage slot.
3. To stow the step for travel, lift the front end of step, push in, then lower front of step to engage retention notch. See Figs. 21A & 21B.

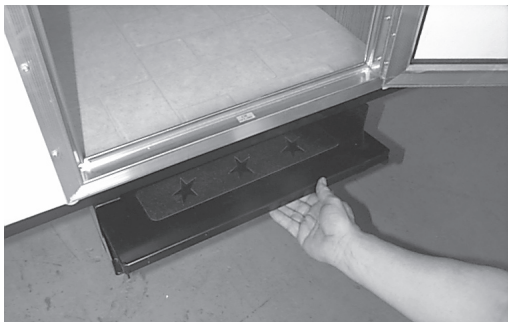


Fig. 21A & 21B. Step operation.

## Installing the Awning & Screen Room

The awning and screen room available for your new Starcraft RV, Inc. tent camper have multiple manufactures. Please refer to the instructions provided for each of these accessories.

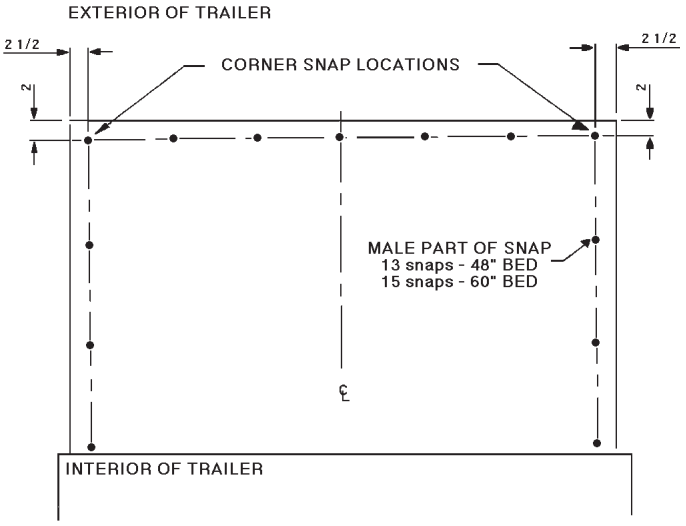
**NOTE:** For added security or in windy weather, the uprights should be anchored to the ground with hook stakes. The awning is not designed to withstand winds greater than 15 m.p.h. Roll up your awning if you suspect winds of this magnitude approaching, if it is raining, lower one of the front corner posts about 4″ to allow the water to escape.

## Bunk End Hide-Away Installation Instructions

*Rear end bed only*

1. Attach male snaps to the bottom side of the slideout bunk board at the two corners (see Drawing 1).
2. Snap the hideaway vinyl skirt corner female snaps to the corner male snaps. They are located directly above the stake hook slots in the hideaway skirt.

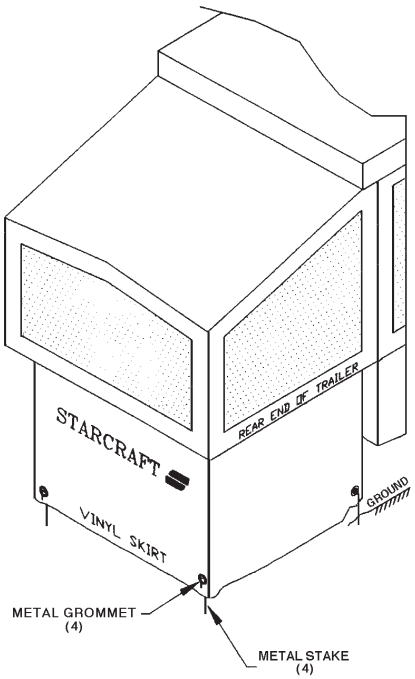
3. **All existing male snaps should be fastened to the bunk board. Use the female snap located on the hideaway skirt to space the male snap.**
4. **Insert four metal stake hooks through the metal grommets on the bottom of the skirt. Press firmly into the ground. (See Drawing 2.)**




**BOTTOM VIEW OF SLIDE-OUT BACK BUNK**

Diagram shows 48" bed with 13 snaps.
60" bed has 15 snaps.

Drawing 1

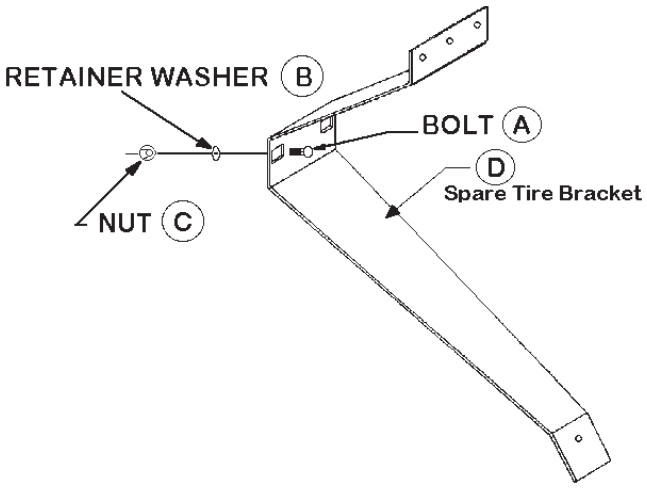



Drawing 2

## Spare Tire Installation

**All Starcraft RV, Inc.'s have a rear spare tire mount assembly. For installation, proceed as follows (see Drawing 3):**

1. **Insert bolt (A) through the square hole in the spare tire bracket (D).**
2. **Holding bolt (A) in place, slide one retainer washer (B) over thread portion of bolt.**
3. **Follow steps 1 & 2 for both bolts.**
4. **Place the spare tire over the two bolts and attach nuts (C) and tighten securely.**




Drawing 3. Starcraft RV, Inc. spare tire bracket, bolt, washers & nut assembly.

## Bunk Light Installation

**Dome lights now contain a 12 volt power jack for connecting remote bunk lights. See Fig. 22 & 23.**

1. **Place the 12 volt light at midpoint on the tent roof and snap it to the tent support bar. The cord should be extended toward the light receptacle.**
2. **It is recommended that you wrap the cord around tent support bar a minimum of two times.**
3. **Insert the cord plug into the 12 volt jack in the dome light.**

**CAUTION: 12 volt lighting will produce heat. Care should be taken when handling the fixture after the light has been on for some time.**

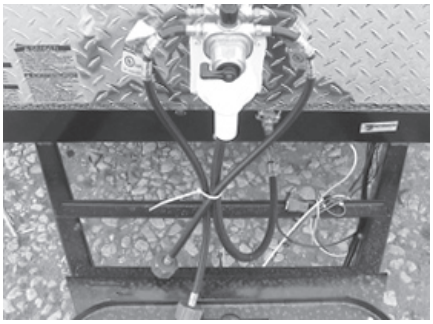
Fig. 22.
Bunkend dome light.

Fig. 23.
Slideout dome light.

## Battery Installation

**The battery rack is standard on all A-frames. No cover is available. See Figs. 24A, B and C. Refer to wiring schematic in the back of the book.**

**NOTE: Also read about battery function in discussion of 12 volt electrical on page 21.**



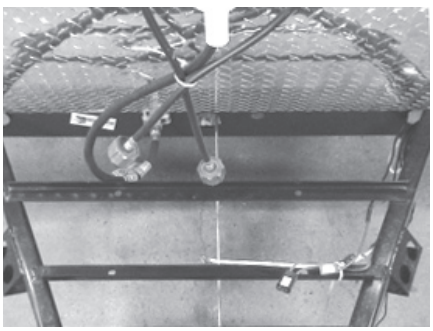


Fig. 24A, 24B.
Different model battery rack applications.

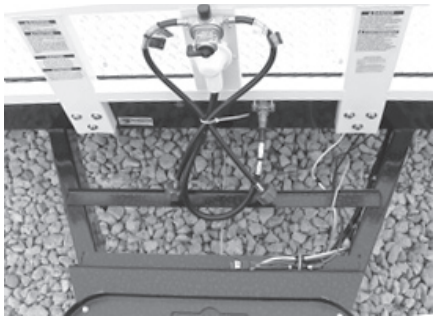


Fig. 24C.
Different model battery rack applications.

**NOTE: Our battery charge harness contains a fuse. Whenever a battery charge line is connected to a tow vehicle battery, that charge line <u>should also be fused at the tow vehicle battery.</u> Fuse according to wire size. A charge line should be minimum 10 gauge wire with a 30 amp fuse.**

# Water Systems

**Fresh water may be supplied to the sink from one of two sources; either a water tank or a city water hookup. Fixtures for both sources are located adjacent to each other on the same side of the camper and are labeled.**

**You should install a pressure reducer in the campground faucet that will limit the pressure to 60 PSI if the source pressure exceeds that amount. The city water bypasses the internal water tank, but does fill the water heater. Open a hot water faucet to help fill the heater tank. In either case, put only clean drinkable water in the system.**

**Water is moved through the system by a 12 volt water pump or city water pressure.**

## Water Fills

**There are two water fills on Starcraft RV, Inc. campers. See Fig. 25 and Fig. 26. The city water fill uses a hose connection which can be used to provide water pressure without the use of the 12 volt pump. The country or "gravity" water fill is used to pour water into the storage tank when water hook ups are not available.**

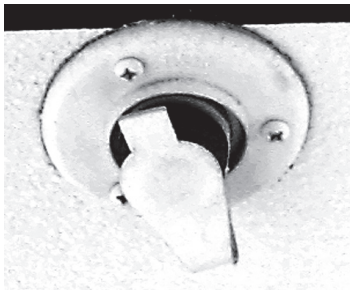


Fig. 25.
City water fill.

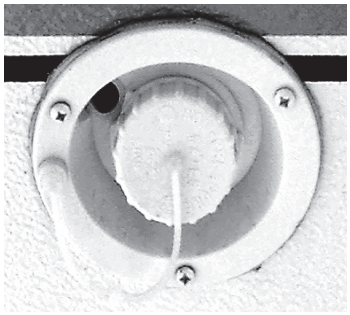


Fig. 26.
Gravity water fill.

When an optional water heater is installed a conventional hot/cold mixing faucet will be installed. This faucet will operate on 12 volt demand pump or city water pressure.

## Sink Drain

The outlet port for the sink drain is located directly beneath the sink area under the trailer. Connect a black garden hose to the sink drain fixture and run it to a park service septic outlet or drain directly into a portable holding tank..

**NOTE:** Sink drainage through a garden hose will be very slow. The longer the hose is, the slower it will drain.

To avoid contaminating your water system, use a white hose for fresh water and a black hose for drainage. If you use buckets, paint or label them.

## Demand Pump

The pressure in the internal water system comes from a 12 volt demand pump. Open the faucet the first time you turn on the demand pump until the water flows steadily, then close the faucet. When the system is pressurized, the pump will stay off until you use water. Then the pump turns on to meet the demand. If it turns on between uses, check the system for leaks. Do not run the pump when the tank is empty. Before breaking camp, turn the pump switch to off and make sure it's off by turning on the cold water faucet. When you're sure the pump is off, close the faucet. See *Step 4* under *Storage,* page 27, for cold weather protection.

## Water Heater

The water heater will fill automatically either from the fresh water tank or when connected to the city waterfill. When filling the fresh water tank, open a hot water faucet briefly, with the pump switch "ON" to allow the water heater to fill. Make sure the water heater is full before trying to light it.

**NOTE:** See the instructions provided by the manufacturer of the water heater for important operating and safety information.

**NOTE:** When draining the water heater, use a 1-1/16″ socket to remove the drain plug. The drain plug is also the sacrificial anode which protects the tank from chemical deterioration and electrolysis. As the water heater is used and aged, the anode will deplete. It will have a rather disgusting, eaten away appearance. This is normal. When completely or mostly gone, it should be replaced.

## 12 Volt Cassette Toilet

Available as an option on some models the 12 volt recirculating toilet is a completely self-contained unit that requires no outside water connection or inside holding tank. Complete operating instructions are included in the manufacturer's literature in the Owner's Packet.

## Shower

Before shower use, remove the cap from the shower drain under the floor and replace it with a 90 degree hose fitting, provided with the shower option. Either connect to a portable holding tank or use a garden hose to drain into the park service or a bucket. A "Y" connection to the sink drain will reduce the amount of hose needed.

To use the shower be sure the drain is open. Open the faucets until the water flows steadily. Use the "ON/OFF" switch on the shower head to wet down and then shut off the water. This maintains proper temperature and conserves water. Once fully lathered, switch "ON" and rinse.

**NOTE:** To prevent excessive moisture buildup, use cross-ventilation when the weather permits, but also open the vent.

## Sanitizing the Water Storage Tank

Sanitize the fresh water storage tank periodically using chlorine solution followed by several clear water rinses.

Prepare a solution of 1/4 cup of household-type liquid chlorine bleach to one gallon of water for each 15 gallons tank capacity.

Close drains and valves, pour chlorine solution into the storage tank, and complete filling the tank with fresh water.

Open faucets in turn until water flows steadily to purge air from lines.

Top off the tank with fresh water and allow the solution to work for three hours.

Drain the tank and flush the entire system with fresh water.

If the chlorine taste lingers, pour a solution of one quart of vinegar and five gallons of fresh water into the tank and allow it to remain there for a day or two, agitated by the normal motion of driving. Then drain the tank and flush the system until the vinegar taste disappears.

**WARNING: DO NOT use contaminated system until it has been cleaned and thoroughly flushed (4 - 6 flushes), with water. Keep children away from unit until the water is safe to drink.**

## Draining the Water System and Heater

If the camper is to be stored in temperatures below freezing, the fresh water system should be drained as follows:

1. Empty the fresh water storage tank by opening the tank drain valve. If the tank is above the floor, the valve is on the end of the tank and is accessed from inside the camper. If the tank is under the floor, in the frame, the tank drain is under the floor also, to the rear of the tank, off to the side, hanging from the frame. The drains that are accessed from inside the camper are attached directly to the end of the tank with a piece of white hose connected, which passes through the floor. Rotate the valve handle to open the valve to drain the tank. The drain valve for tanks under the floor is a push-pull "T" handle. To open the valve, pull the handle outward. To close the valve, push the handle back in.
2. Turn the pump to "On" and open cold water faucets.
3. Turn the pump to "Off" when the flow of water stops.
4. Open the drains on the hot and cold water pipes located under floor of unit. The drains consist of male pipe thread fittings with screw on caps. See Fig. 27.
5. Open the drain valve on the bottom of the water heater, as well as the water heater safety valve. See Fig. 28.

Fig. 27.
Low point drains - typical.

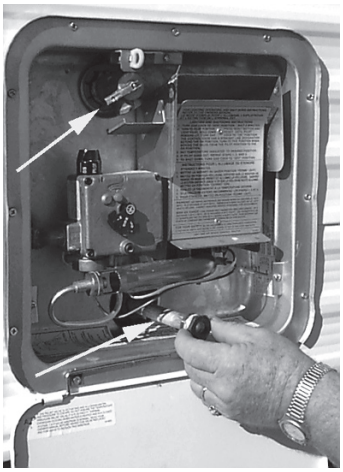


Fig. 28.
Water heater; pressure relief valve at top, drain valve anode at bottom.

**DO NOT** run the pump without water in the system. Always keep the pump switch "off" when the system is empty or when connected to city water. Running the pump dry can damage it and will void the warranty.

**NOTE:** when draining the water heater, use a 1-1/16″ socket to remove the drain plug. The drain plug is also the sacrificial anode which protects the tank from chemical deterioration and electrolysis. As the water heater is used and ages, the anode will deplete. It will have a rather disgusting, eaten away appearance. This is normal. When completely or mostly gone, it should be replaced.

### Winterizing the Water system

Once you have drained the water system, as instructed above, the system can be winterized in two ways. The first step, in either approach, is to pour at least a half gallon of potable antifreeze into the water tank. Then turn on the pump to draw antifreeze through the water pump, thus winterizing the pump. You may use store bought potable, non toxic RV antifreeze.

If you choose to do so, you can winterize the whole trailer with antifreeze. This will require additional antifreeze. If your camper has a water heater, you will need to make, or purchase, a means of bypassing the water heater, so as not to fill it with antifreeze. Pump antifreeze through all water lines and all faucets.

The best way to winterize is to use air. You can purchase at your local hardware store, or perhaps from your dealer, enough parts to adapt the city water fill connection to an air hose connection. Simply blow all water out by opening all drains and faucets. Set regulator for not more than 60 PSI.

**REMEMBER**, you must use RV antifreeze to winterize the pump, even if you winterize with air.

**WARNING: Automotive or windshield washer type antifreeze can be fatal if swallowed. DO NOT use them in the fresh water system.**

# Electrical System

### 110 Volt AC

110 volt AC power is distributed to the camper through the converter. Two circuit breakers can be found on the left front of the converter face. Unlock the door for access. The 15 amp breaker powers the converter and the recepts in the camper. The 20 amp breaker is for an air conditioner. To power the converter and interior recepts, find the 30 amp power cord on the off door side of the camper (located in a round hatch). Pull the cord out and plug into the campground power stand. Most campgrounds provide 30 amp recepts. Avoid cheater plugs and 15 or 20 amp recepts as much as possible. You can plug into a 15 or 20 amp recept, but you will not be able to run an air conditioner. If 110 volt AC powered devices are used outside the camper, use the GFI protected recept on the door side exterior side wall.

### Circuit Overload

To reset a circuit breaker after an overload:

1. Turn off all electrical appliances.
2. Reset the breaker by turning it momentarily to the "OFF" position, then back to "ON".

Determine why the circuit breaker "tripped". The cause could be an overloaded circuit, a faulty appliance (or other piece of electrical equipment), or defective wiring.

**WARNING: DO NOT use a 15 amp extension cord on campers that have a 30 amp power cord, or use a cheater plug that would eliminate the grounding circuit (third wire) on the power cord. Failure to comply could result in electrical shock and/or fire.**

### 12 Volt DC

12 volt DC power to the interior of the camper is supplied by an onboard battery, or by the converter when the camper is plugged into 110 volt AC power. Running lights are powered by the tow vehicle and are fused in the tow vehicle. An onboard battery is charged by the converter and can be charged by the tow vehicle, provided the tow vehicle is wired for that purpose.

Refer to the 12 volt schematic at the end of this owner's manual for pigtail hookup.

The running lights, brake lights and turn signals are wired to operate on 12 volt power from the tow vehicle. The interior lights and options of water pump, furnace and electric toilet operate on 12 volt DC supplied by the converter, or an onboard battery. The converter switches automatically to battery when powered down.

**NOTE:** When a charge line is installed to charge an onboard battery, the factory battery charge harness, which is 10 gauge cable, contains a 30 amp fuse at the battery. When the tow vehicle is wired, use at least 10 gauge wire, which must also be fused at the tow vehicle battery. There must be a fuse, appropriately sized, at each power source.

Prolonged battery use or long term storage with the battery connected to the converter will run a battery down, therefore requiring recharging. To minimize battery draw down, use a deep cycle battery with not less than 150 minutes of reserve. Conserve power use. Wire your camper and tow vehicle to charge the battery while in transit.

The converter used in the 2007 campers is an all electronic converter using the latest high tech circuitry and, therefore can produce steady, clean output, voltage, even during low or high input voltage variations. All converters have charging

capability from a low trickle charge to maximum output of 30 amps.

To access the 110 volt AC circuit breakers, the 12 volt DC output fuses, and the battery to converter fuse, open down the plastic door. The fuse to the far right is the battery to converter fuse.

**NOTE:** Do not use replacement fuses with higher amperage ratings.

These converters will not self destruct when subjected to short circuits or overloads. An internal overload/short circuit sensor will shut the converter down. If this overload/short circuit situation develops and 12 volt DC output ceases, determine the cause and location. A short circuit will shut the converter down instantly, even before a fuse is blown! A red LED at any of the fuse locations indicates a blown fuse or open 12V circuit such as a loose or cut wire. Once the fault is corrected, the converter will come on again. If an output fuse has been blown, replace it. When the converter 12 volt DC output has shut down, 110 volt AC will still be available in the camper.

An AC input fuse is built into the circuit board to protect the converter board from high AC voltage input spikes. If the AC input fuse blows, there will be no 12 volt output, but you will still have 110 volt AC in the camper recepts. The AC input fuse is replaceable.

The converter has an automatic battery maintenance processor which keeps the battery charged while the unit is plugged in. This prevents overcharging of the battery and also prevents sulfating of the battery. Because of circuit design, the converter, when not in operation, will draw current from the battery on an average of 10 milliamperes. Additionally, the propane detector will draw approximately 75 milliamperes. To avoid a dead battery during long term storage , which will occur in 10 to 20 days, depending on battery condition, disconnect the battery from the converter. This can be accomplished by (1) disconnecting the positive battery cable, (2) pulling the 20 amp fuse in the battery to converter harness at the battery, or (3) pulling the battery to converter fuse in the converter. This fuse is located at the far right end of the fuse block in the right face of the converter. A red wire can be seen coming into the fuse holder.

When in 12 volt mode, a refrigerator operates on battery power only. The 12 volt mode for the refrigerator is a maintenance mode only, to be used only while in transit. The refrigerator could be powered by an onboard battery, but only if it is being charged by the tow vehicle. Preferably, the refrigerator should be powered directly from the tow vehicle through the chassis plug. When not in transit, the refrigerator should be in propane mode, or to 110 volt AC mode. See the 12 volt schematic at the back of this manual.

**NOTE:** All Starcraft RV, Inc. fold-down campers have a kill switch for the dome lights. These switches are located either to the fold over sink cabinet base top or the dinette seat base top depending on the model. See Fig. 29 & 29A. When the sink cabinet and dinette seat back lid are in the set up to use, 12volt power is supplied to the dome lights.

When the sink cabinet and the dinette back are stored in the travel position, the dome lights will not operate due to the kill switch cutting off the power supply.

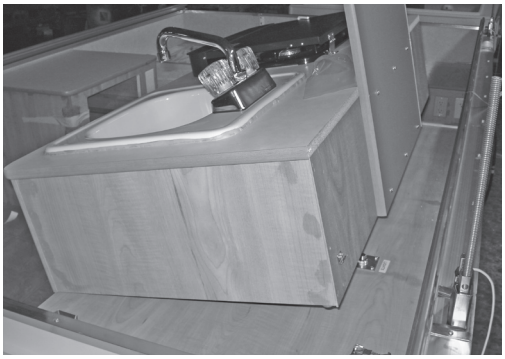


Fig. 29. Sink cabinet kill switch

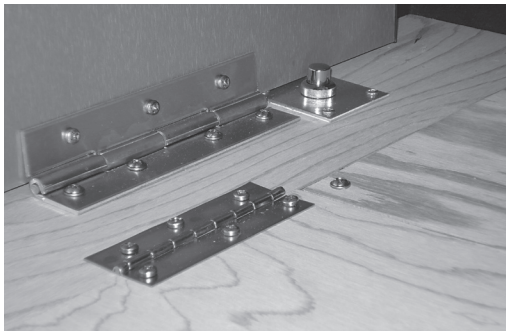


Fig. 29A. Dinette seat lid kill switch

### Electric Brakes

Electric brakes are powered by the tow vehicle and are actuated by an electronic controller mounted under the dash in front of the driver. The brakes will operate automatically during deceleration or can be hand operated. Connection to the trailer is provided for in the car-to-camper pigtail and the trailer chassis harness. Install and adjust an electronic brake controller according to manufacturer specifications. *See 12 Volt Schematic.* See, also, *Service Interval Chart,* page 36.

# Propane System

Propane is an efficient, inexpensive, portable fuel that burns readily with intense heat. It is used for cooking, heating, and refrigeration. The propane systems are designed and built to rigid standards. They are tested before leaving the factory and with proper care and maintenance they are safe. Except for simple connection tightening, take your unit to the dealer for propane problems. The propane bottle should always be filled and the regulator checked by an authorized propane supplier. Read the manufacturers' instructions before using any propane appliance.

**NOTE:** STARCRAFT RV, Inc. is not responsible for personal injury or property damage resulting from improper use or maintenance of propane appliances or systems.

Propane has a distinctive odor (you might notice this as you light the appliances). If you smell propane, immediately investigate the source. The propane is heavier than air and settles in low areas. It could cause suffocation or create a fire hazard. Your camper has installed, on the inside, a propane detector. Read the propane detector owner's manual and understand how it operates.

**WARNING: DO NOT bring or store propane containers, gasoline, or other flammable liquids inside the camper. Propane bottles are equipped with safety devices which relieve excessive pressure by discharging propane to the atmosphere. An improperly used or poorly maintained propane system can cause a fire or explosion.**

To operate any propane appliance, be sure all appliances are off, then open the service valve on the bottle, found on the "A" frame. At first some air in the propane line may escape as you open a valve, extinguishing your lighter. Likewise when you close the bottle service valve, some propane remains in the line unless you light a burner to burn off the excess. Turn the burner off when the flame burns out.

As of September 1, 1997, we have been using the new Type I OPD valve (overfill prevention device) on all propane tanks (4-40 lbs.), on all RV products. This new Type I OPD valve is designed with both male external and female internal threading. It will accept the old POL and regulator you're accustomed to seeing and it will accept the new Type I hose connection, which became mandatory September 1, 1998 on all propane tanks 4-40 lbs., which now connects the detached regulator to the tank.

The new Type I OPD valve now contains a float operated valve which shuts off propane entering the tank when being filled, at the 80% level, preventing overfilling. It also contains a new, improved, more sensitive excess flow valve which will prevent propane escaping into the atmosphere on all full tanks with no hoses or regulators connected. On the old tank valves, you could open the valve and empty the tank into the atmosphere. Because of the new, more sensitive excess flow valve, we all must learn how to open tank valves. After filling a tank and reconnecting it to the propane system, you MUST open the Type I OPD tank valve SLOWLY. **Opening the tank valve quickly will lock out the new excess flow valve, preventing propane flow into the propane system. If this happens, close the tank valve, disconnect the L.P. hose at the tank to bleed off pressure. Reconnect the hose and open the valve very slowly, check the reconnection for leaks with a 50:50 solution of liquid soap and water. This new excess flow valve will not lock out when an appliance, such as a furnace, comes on.**

Regarding old tanks and valves and the new regulations now in effect: As of October 1, 1998, any propane tank, 4-40 lbs., which has reached its 12-year recertification date (12 years from date of manufacture stamped onto the tank), must either be replaced or refitted with the new Type I OPD valve. It will probably be less expensive to replace the tank as a replacement valve will likely be more expensive than a new tank with a new Type I OPD valve on it.

The new Type I OPD valve is easily identifiable in that it is a 3-sided handle with OPD cast into the handle. The new Type I hose connection uses the external threading on the Type I OPD valve and black or green plastic. The new regulations mandating this new propane equipment and rules were created and established by the NFPA (National Fire Protection Association) and are administered by the RVIA. See Fig. 31.

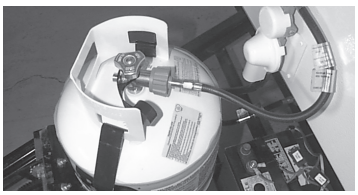


Fig. 31. New OPD.

**⚠ DANGER**

**IF YOU SMELL PROPANE**

1. Extinguish any open flames, pilot lights and all smoking materials.
2. Do not touch electrical switches.
3. Shut off the propane supply at the container valve(s) or propane supply connection.
4. Open doors and other ventilating openings.
5. Leave the area until odor clears.
6. Have the propane system checked and leakage source corrected before using again.

FAILURE TO COMPLY COULD RESULT IN EXPLOSION RESULTING IN DEATH OR SERIOUS INJURY. DD-90

## Single Propane Bottle

Single propane bottles are mounted to a bracket or tray welded to the A-frame, using tie down hook straps. See Figs. 32A & 32B.

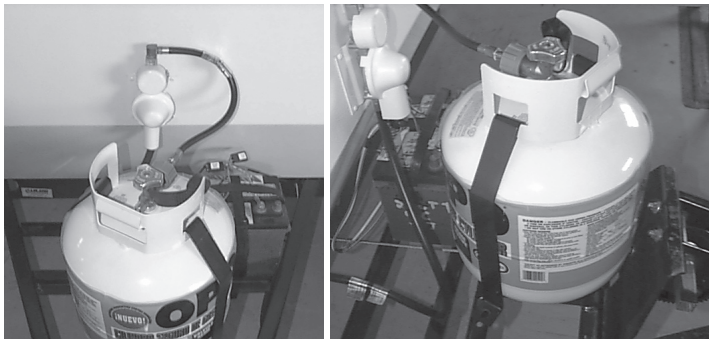


Fig. 32A & 32B. Single propane bottle and retainer straps.

## Double Propane Bottles

Double propane bottles come installed on some models. The regulator is somewhat different from that on the single bottle, and the hold down brackets are different. Refer to the photographs. See Fig. 33 and Fig. 34.

Fig. 33. Auto switch over valve.

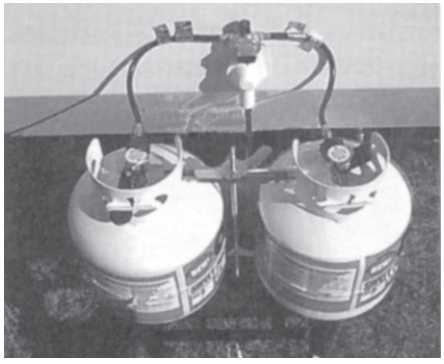


Fig. 34. Double propane bottle installation.

### Auto Switch Over Valve

The auto switch over valve is part of the pressure regulator and is at the top of the regulator. Notice the plastic dome with a pop up red/green indicator. The purpose of the switch over is to allow automatic switching from an empty tank to the second, presumably full tank. See Fig. 33.

When two full tanks are installed, open both tank valves. When one tank goes empty, a red indicator will pop up in the dome. The valve will automatically switch to the full tank. On the front of the switch over valve is a black plastic lever. Move the lever toward the full tank. Whichever way you move it, it will be to the full tank. Once you have moved the lever toward the full tank, the green indicator will again appear. You may now close the valve on the empty tank, remove the tank and have it refilled. Reinstall the full tank, connect the hose and open the tank valve.

**NOTE:** Both tank valves must be open in order for auto switch over to occur.

### Filling Propane Bottles

Turn all propane appliances in the camper to the "OFF" position, and close the service valve on top of the propane bottle(s) finger tight. Disconnect POL nut (right-hand thread) from the propane bottle, then remove the bottle(s) from the mounting frame.

Take the bottle(s) to an authorized propane supplier to be filled. Always transport the bottle in an upright position.

When installing filled bottles, fasten the bottle(s) securely to the camper, attach the regulator, and **MAKE SURE THAT ALL PROPANE APPLIANCES ARE SHUT OFF BEFORE OPENING THE SERVICE VALVE.** The service valve should be closed when the camping trailer is not in use.

**WARNING: DO NOT smoke, strike a match or use any kind of open flame near propane bottles when they are being filled. A fire or explosion may result.**

### Propane Bottle Maintenance

A regulator dust cover or a bottle cover should be used at all times. Propane bottles should be kept free from rust and painted white (or some other highly reflective color) to reduce expansion of propane because of heat.

### Propane Line Check

After each refill and each 5,000 miles or every 30 days the propane line should be checked.

Check the propane line connections as follows:

a) Turn off all burners and pilot lights.

b) Open the door and windows.

c) Open the propane bottle service valve.

d) Test all line connections with an approved leak detector, bubble solution or soapy water. **DO NOT** use ammonia, chlorine solutions or an open flame. If bubbles indicate a leak, tighten the connections until bubbles stop. If bubbles persist, close the service valve and contact your Starcraft RV, Inc. dealer or authorized propane supplier.

### Regulator

The regulator pressure should be checked periodically to ensure efficient operation of the appliances. The correct line pressure for all of the propane appliances is eleven (11) inches of water column pressure. Most propane suppliers have the equipment to make this check for you; line pressure should be tested at least every six month.

**NOTE:** Propane regulators must always be installed with regulator vent facing downward. Regulators that are not in compartments have been quipped with a protective cover. Make sure that regulator vent faces

### Freeze-Up

Freeze-up of propane bottles is usually caused by one of three things:

1. Moisture in the bottle.
2. A greater demand than the bottle capacity at a particular temperature.

You can use these precautions to prevent this problem:

1. Use moisture-free propane.
2. Keep the service valves closed during storage.
3. Have the dealer add anhydrous methanol.

If moisture is present, have the dealer purge the bottle. Since propane does not vaporize as rapidly in cold weather, normal demands may become excessive and cause a refrigeration effect which can freeze up the regulator. Your dealer can tell you about appliance demands which can be met by your bottle at various temperatures.

## Lifter System

Note: Some Starcraft RV, Inc. tent campers have an optional power winch. Please refer to the **Powerwinch** operation manual included in your owners packet.

All Starcraft RV, Inc. lifter systems are brake winch operated. When you crank the roof up, the weight of the roof is ultimately supported by a locked-up brake mechanism inside the winch. To lower the roof, you simply turn the crank handle counter clockwise. Once the brake releases, it will continue to slip as you continue to crank, allowing a smooth descent. If you stop cranking, going up or down, the brake and pawl hold the roof in place.

When cranking the roof up, you must hear a continuous clicking sound. The clicking is a spring loaded pawl clicking across a toothed wheel between the brake pads. It is this pawl and toothed wheel that physically supports the roof. If you do not hear the clicking, **BEWARE,** the roof may fall. If the pawl disengages and the roof falls, the crank handle will spin rapidly and freely. Carefully lower the roof and take your camper to a Starcraft RV, Inc. Dealer for repairs. This failure, while possible, is rare. See Fig. 35.

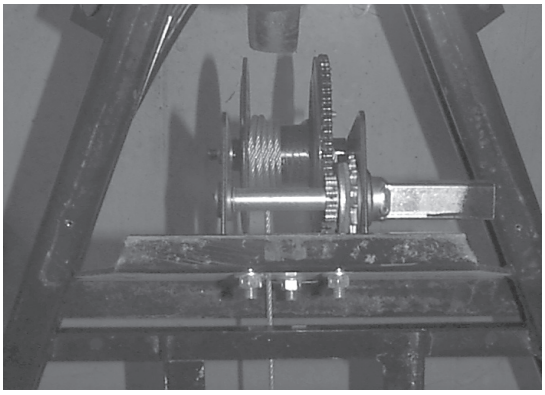


Fig. 35. Winch showing brake and pawl.

When lowering the roof, you will not hear the clicking sound because the brake is slipping, not turning.

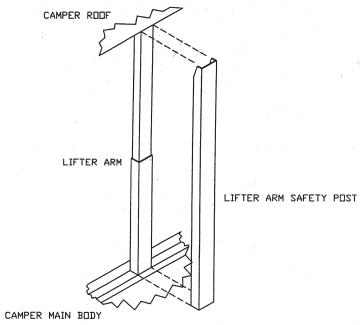
Winches do not have up and down stops. They have only an up stop indicator in the form of a red cable between the lower side wall and the roof. Over cranking, or cranking against a latched down roof, can have serious consequences in the form of bent frame members, ruptured spring tubes, or broken cables.

**DO NOT FORGET TO UNLATCH ROOF LATCHES.** Serious damage can occur which is not warranted.

After raising the camper roof, the lifter arm safety posts must be installed as shown. The safety posts should be installed in opposite corners, left front and right rear–or right front and left rear.

For care and maintenance of the lifter system, see the *Service Interval Chart* on page 36 and *Standard Care* on pages 37 & 38.

**NOTE:** If mechanical, operational, or levelness difficulties develop with the lifter system in your camper, contact a Starcraft RV, Inc. Dealer.




# Take-Down
## (non slideout models)

### Interior

1. Zip up the plastic windows and close the curtains, or remove them from the curtain tracks. Close the roof vent, and unzip the canvas corners three fourths of the way.

2. Turn the range control knobs to "OFF", and turn off the furnace propane valve and the thermostat. Put the sink cabinet into its storage position.

3. Turn off the interior lights, the patio light. Place the carryout range in its storage position. Store the table and the seat cushions.

4. Unfasten the velcro that holds the bunk ends to the top of the sidewall. Remove the overhead poles and store them under the bunk cushions. Fold down the bed bows and close or remove the privacy drapes. The bed bows must be down all the way to prevent damage to the bunk end canvas.

5. Detach the canvas sidewall flaps from the screen door frame, swing the screen door to the roof, and secure it in place.

6. Make sure that all loose items are stowed properly and that nothing sticks up above the sidewalls.

### Exterior

1. Shut off the service valve on the propane bottle.

2. Turn the water heater and refrigerator propane controls to "OFF".

3. Disconnect the electrical and water hookups, and switch the refrigerator to 12 volt DC operation via the outside access panel.

4. Unfasten the velcro that holds the lifter covers in place. Unfasten the velcro and shock cord loops that hold the canvas to the underside of the bunk ends, and fold the canvas in neatly. Fold the bunkend side curtains and place on top of the bed with the outside of the panels against the outside of the bunkend top. Lay out as neat as possible avoiding bunched up tent material. Pull the corners of the bunkend off of the corners of the bed to prevent them being damaged at the end of the wall cap bed slides when pushing the bed in.

5. On 60″ and larger beds, remove the outer single tube bed supports which are not hooked over the end wall. Slide the beds into the camper. Store the bed braces and supports under the bed mats. The beds **MUST** be pushed in before lowering the roof, even part way, to avoid tearing the tent side panels.

6. Retract the stabilizer jacks up to the travel position.

**CAUTION: To keep the lifters from binding, raise the stabilizer jacks BEFORE lowering the roof.**

7. Lower the roof by turning the lifter crank in a counterclockwise direction. Keep the canvas tucked inside the camper and well away from the lifter posts to prevent tears and rips. Do not pinch the canvas between the roof and the sidewall.

**NOTE:** If an awning or a screen room option is used, they will be easier to remove when the roof is at a convenient working height. Roof-mounted awnings should have the poles and rafters removed or collapsed as the roof is lowered.

8. Lower the roof and latch the roof latches.

9. Stow the step.

# Take-Down
## (slideout models)

Take down for slideout model campers, except for the slideout itself, is the same as any other camper. Before lowering the roof, the slideout must be knocked down and pushed in.

### Interior

1. Remove slideout dinette cushions. Store seat back cushions in one dinette. Store seat cushions wherever you can find space. Fold seat backs down and place the table in the storage position between the dinette seats.

2. Remove bunkend tent support pole and store under the bed mattress. Fold tent bow down onto dinette.

### Exterior

1. Unfasten the velcro and pull the tent out of the tent retainer on the front and rear slides of the slideout room. See Fig. 16, page 16.

2. Push slideout room in.

3. Pull slideout tent outside camper, allowing it to hang down on the outside of slideout before pushing bed into camper. When beds are in, replace the slideout tent inside the camper on top of the beds. This procedure is performed to avoid damaging the slideout tent when pushing the beds into the camper.

# Miscellaneous

## Appliances & Accessories

Although the appliances operate much like the ones in your home, carefully read the operation and maintenance instructions. Specific instruction sheets, manuals, and warranty cards are found in the owner's packet, or are attached to the appliance. Complete the warranty cards, mail them as indicated, and record each unit's model and serial number on the page provided at the end of this manual.

Open flame combustion consumes oxygen from the air. Flame burning propane units each have an outside fresh air supply; except for the range. **DO NOT use the range to heat your camper.** Also, see *Special Safety Procedures,* page 8.

**WARNING: Laws in some states prohibit the operation of any propane appliance while in motion because of the danger of fire or explosion if an propane line under pressure happens to be ruptured in an accident.**

## Furnace

Starcraft RV, Inc. campers can be equipped with a propane furnace which has a thermostat. When operating the furnace, make sure that the inlet/exhaust vent is free from obstructions.

The thermostat also has an on/off switch at the bottom. Read the manufacturer's instructions thoroughly before operating the furnace.

**CONSULT THE MANUFACTURER'S INSTRUCTION SHEETS FOR IMPORTANT SAFETY AND OPERATING INFORMATION ON THE FOLLOWING APPLIANCES:**

## Water Heater

The fast-recovery propane-fired water heater provides a continuous supply of hot water.

Instructions for lighting and operation of the water heater are located in the water heater compartment which is accessible from the outside of the trailer.

**NOTE:** New chamber coatings may give off a slight odor the first few hours of use.

## Refrigerator

A three-way refrigerator is offered as an option to the standard ice box in tent campers. A refrigerator has three operating modes: propane and 110 volt AC, which are primary, and 12 volt DC which is for in transit use only.

Propane or 110 volt AC should be used to get the refrigerator cold initially and for continuous operation while parked. The 12 volt DC mode is a temporary maintenance mode only and can **ONLY** be used to keep the refrigerator cold while traveling. In the 12 volt DC mode the refrigerator will run on a battery drawing 10 amps continuously as there is no thermostat in the 12 volt DC mode.

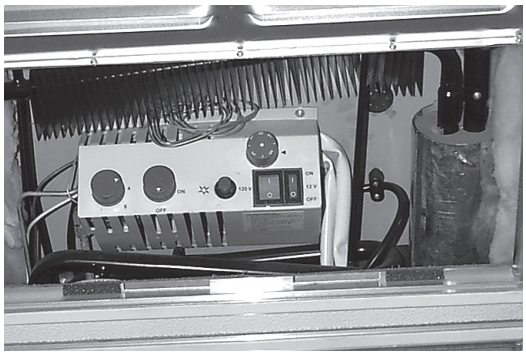
The battery to which the refrigerator is connected must be continuously charged by the tow vehicle. If the power source is an on board battery, the battery must be charged by the tow vehicle alternator. Otherwise, connect the refrigerator to the tow vehicle battery. **NEVER** connect the refrigerator to the converter. **REMEMBER** to switch from 12 volt DC to propane or 110 volt AC when stopped for extended periods, or when at the campground. See, also, *Electrical System*, page 28.

More detailed instructions will be found in the manufacturer's owner's manual pertaining to start up, operation and defrosting of the refrigerator.

**NOTE:** On electrical switches, I = ON and O = OFF.

Several suggestions to reduce the cooling load are:

1. Cool the night before departure in propane or 110 volt AC mode.
2. Freeze or precool the items you can.
3. Park your camper in the shade. After each trip, empty and clean the refrigerator (or ice box). Use warm soapy water (dish soap) and wipe dry. Prop the door open when the unit is not in use.



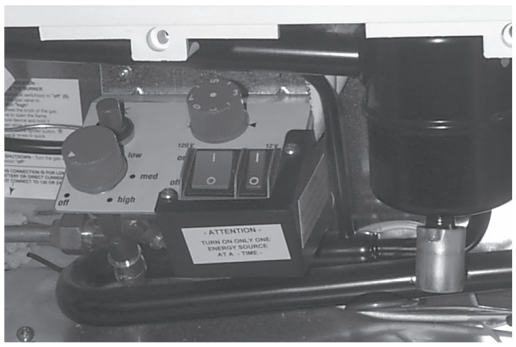



Fig. 36 and Fig. 37.
Refrigerator controls.

## Air Conditioner

An optional air conditioner is available to provide comfort cooling during the warm summer months.

All 2007 fold down camper roofs are A/C-ready as standard equipment.

Starcraft RV, Inc. will not be responsible for any damages resulting from the installation of any unapproved air conditioners.

**ANY SUCH UNAPPROVED INSTALLATION WILL VOID THE WARRANTY ON THE ROOF AND LIFTER SYSTEM.**

**NOTE:** The total weight, in addition to the standard roof and canvas configuration that can be added to the lifter system is not to exceed 175 LBS for the 3-stage lifter system. These figures are the total combined weight of items such as the air conditioner, A/C prep package, awning, bike rack, boat rack, etc. Any combined weight above these figures will void the lifter warranty.

# Fire Safety

Make certain everyone in your party is familiar with the emergency features of your trailer, location of exits, and location and operation of the fire extinguisher.

## Fire Extinguisher Locations

Fire extinguishers are located close to the entrance door of the trailer, mounted on the wall or side of a cabinet. Know where the extinguisher is located and **CHECK IT FREQUENTLY** to assure that it is in good working condition.

If a fire does start, get all people outside. Use the fire extinguisher. If the fire cannot be extinguished quickly, **GET OUT!** Close the propane service valve and call the fire department. **DO NOT** re-enter the unit until officials declare it safe.

Replace a used fire extinguisher as soon as possible.

## Emergency Exits

Emergency exits are identified by an "EXIT" sticker located on the ceiling or on bunk end panel. See Fig. 38. Make sure that everyone who uses the camper knows where the exits are and is able to operate them in an emergency.

In the unlikely event of an emergency, grab the zipper pull at the lower edge of the tent assembly at the corner lifter post and pull up. This same procedure can be used at all four corner lifter posts.

Prevention is the best form of safety. Follow the same rules you would at home.

Follow the propane system instructions carefully and perform the periodic maintenance suggestions.

1. **DO NOT smoke in bed.**
2. **DO NOT overload electrical circuits.**
3. **DO NOT use matches, candles, or lighters as flashlights.**
4. **DO NOT store flammable liquids inside the camper.**
5. **DO NOT permit children to play with the propane or electrical appliances.**

Fig. 38. Emergency exit.

# Cold Weather Use

If the camper is to be used during the winter months, several precautions must be taken:

1. Do not use the stove for comfort heating. Asphyxiation could result.
2. Use a nontoxic antifreeze solution in the water system, or blow the system dry.
3. Do not attempt to raise the roof when the temperature is below 20° F without pre-warming the interior. The vinyl windows or bunk ends may crack.
4. Do not use butane in your propane system. It will not vaporize below 32° F. Propane will continue to vaporize to 44° below zero. Note that heating consumes propane rapidly so monitor the supply closely.
5. When cooking, keep the vent and/or window open to prevent condensation buildup and possible asphyxiation.
6. When camping in cold weather, cross ventilation helps slow condensation forming on the canvas.

# Storage

**NOTE:** Open the camper every two months and inspect its general condition.

If instead of using your camper during the winter months you must store it, follow these steps:

1. Clean it out thoroughly. Remove all perishable or usable food and medicine. Wipe the refrigerator out with a damp cloth and baking soda and leave the door propped open. Vacuum the upholstery and remove all the stains. Clean the floor. Remove draperies and clean and store them inside the unit.
2. Shut off the propane outlet valve at the tanks.
3. Level the unit for good drainage. Open all the faucets and the drain valve on the water heater. Remove the drain cap to empty the pipes and reinstall the cap. Close all the faucets and drains. Blow out water heater.
4. Pour about 1/2 cup of potable RV antifreeze (or one of the solutions listed below) into the sink and shower drains to prevent freezing. If so equipped, run the 12 volt pump to make certain that it is protected by the antifreeze solution.

a) 60% Glycerol, by weight in water, undiluted.

b. 22% Magnesium Chloride, by weight in water, undiluted.

**WARNING: Automotive, radiator, or windshield washer antifreeze could be fatal if swallowed. DO NOT use them in the fresh water system.**

5. Squirt graphite lubricant into all door locks and apply lubricant to the door hinges.
6. Whenever possible, block the trailer up, taking the weight off the wheels. Jack and block the trailer at the frame, not the axle beam. Reduce tire pressure to about 14 PSI. Spin the wheels to coat all roller bearings and races with grease. This procedure will prolong tire life, reducing cracking, prevent rust from condensation inside the wheel bearings, and extend torsion axle life by reducing axle settlement during long term storage. **DO NOT** use stabilizer jacks to lift the camper.
7. Complete lubrication of the winch lifter system and cable, as described in the Standard Care section, pages 30 & 31, should be completed before long periods of storage to prevent rust or corrosion from damaging moving parts.
8. Wax trailer with an automobile wax.

9. If the trailer is covered with plastic or canvas, the door and/or roof vent should be opened to provide adequate ventilation so that moisture will evaporate.
10. Sweep snow off the roof as soon as possible. **DO NOT** allow snow to accumulate because the weight, in addition to freezing and thawing, may damage the roof. Damage due to such a condition will not be covered under warranty.

**NOTE:** If at all possible, we recommend storing the unit inside.

# Condensation

## Effects of Long Term/Cool Weather Occupancy

Your tent camper was designed primarily for recreational use and short term occupancy. If you expect to live in your camper for extended periods of time, or in cold or cool weather, be prepared to deal with condensation and the humid conditions that may be encountered. The normal activities of even a small number of occupants in the relatively small volume of a modern recreational vehicle, with its thin walls and tight construction, will lead to rapid saturation of the air inside the trailer and the appearance of visible moisture, especially during cold weather.

Estimates indicate that a family of four can vaporize up to three gallons of water daily through breathing, cooking, bathing, and washing. Unless this vapor is carried outside it will condense on the inside of the tent sides or bunkend ceiling as moisture. In cold weather, it will appear as frost or ice. It may also condense in the walls or the ceiling and appear as stains on the paneling. Condensation is a function of nature and is not a warranty matter.

## Controlling Condensation

Interior condensation can be reduced (during cold weather) with the following steps:

1. Ventilate with outside air. Partially open a roof vent and windows to provide controlled circulation of outside air to the inside of the trailer. This will increase the heating load on the furnace somewhat, but it will greatly reduce condensation. You should increase ventilation when large numbers of people are present.

   **NOTE:** Even when it is raining or snowing, outside air is much drier than interior air and will effectively reduce condensation.

2. Install a dehumidifier. The use of a dehumidifier will reduce the need for outside ventilation. As a result, the heating load on the furnace will be reduced.

# Warranty Repairs

Your new unit is the result of Starcraft RV, Inc.'s dedication to provide a product that will assure years of camping enjoyment. This dedication is extended through the design, engineering, and manufacturing as well as customer service and repairs. Should a problem develop with your new Starcraft RV, Inc. as a result of workmanship or materials, we want it corrected and back in service just as much and just as quickly as you do.

The first place to seek correction of a warranty problem is always at the dealership where you bought the trailer. There is a network of dealers across the United States and Canada who are authorized to perform warranty repair work.

For prompt, efficient service, please use your Owner Protection Service Identification Card at the Starcraft RV, Inc. servicing dealer or facility where the repairs are being made.

Keeping the respect and satisfaction of our customers is most important at Starcraft RV, Inc..

We are proud of the quality of our dealers and they can handle just about any problem that might come up with your unit. If you find, after going to the dealer, that you do not receive satisfaction, you may write:

**Starcraft RV, INC. Warranty Services**
**P.O. Box 458**
**Topeka, IN 46571**

# Service & Service Chart

**The operations listed in the Service Chart should be performed on a regular basis. If you are not prepared or equipped to handle these steps, please have them performed by your Starcraft RV, Inc. Dealer or other qualified service technician.**

| | SERVICE INTERVAL: | | | | | | |
|---|---|---|---|---|---|---|---|
| | Each Trip/ Weekly | 500 Miles/ | 1,000 Miles/ 30 day | 2,500 Miles/ 90 day | 3,000 Miles/ 3 months | 5,000 Miles/ 6 months | 10,000 Miles/ Yearly |
| Service To Be Performed: | | | | | | | |
| **Pack wheel bearings** | | | | | | | X |
| **Check brake operation** | X | | | | | | |
| **Adjust brakes** | | | | X | | | |
| **Service brakes** | | | | | | | X |
| **Inspect safety chains** | X | | | | | | |
| **Inspect wiring** | X | | | | | | |
| **Check tire inflation & wear** | X | | | | | | |
| **Inspect hitch components** | X | | | | | | |
| **Lubricate coupler latch & socket** | | | X | | | | |
| **Lubricate hinges** | | | | | | | X |
| **Lubricate locks** | | | | | | | X |
| **Inspect and clean vents** | | | | | | | X |
| **Check lug nut torque** | | X | | | | | |
| **Sanitize fresh water system** | | | | X | | | |
| **Clean drapes and interior fabrics** | | | | | | | X |
| **Inspect exterior seams and openings*** | | | | X | | | |
| **Reseal exterior seams and openings*** | | | | | | | X |
| **Clean battery cables/terminals** | | | | | | X | |
| **Check battery fluid levels** | | | | X | | | |
| **Inspect suspension** | | | | | | X | |
| **Fresh water tank outlet screen** | | | | X | | | |
| **Check, clean and lubricate winch (see Standard Care)** | | | | | | | X |
| **Grease master tube on lift system** | | | | | | | X |

*The seal along the edges of the roof and at the corners of the trailer should be checked every 60 days.

Check the roof for damage (such as punctures from falling objects) frequently. Damage to the roof can result in leaks and subsequent damage to interior parts of the trailer.

# Standard Care

| COMPONENT | STANDARD CARE | AVOID |
|---|---|---|
| **Appliances** | Clean with hot, soapy water. | **Abrasives.** |
| **Countertops** | Clean with hot, soapy water. | |
| **Sink** | Use appropriate cleaners. | |
| **Stove** | Use appropriate cleaners, and coat with film or vegetable oil after cleaning. | **When hot.** |
| **Refrigerator** | Remove food after each trip. | **Abrasives.** |
| **Upholstery Fabric** | | |
| Fabric | Foam type cleaners or hand wash with warm soapy water. | **Dry cleaning.** |
| Vinyl | Vinyl cleaner. | **Dry cleaning.** |
| Drapes | Drapes must be hand washed using a mild detergent and dripped dry. | **Dry cleaning & machine washing.** |
| **Vinyl Floor Covering** | Use detergent soap and water, rinse well, and follow with a clear paste wax or equivalent to obtain best results. | **Abrasive cleaners.** |
| **Woodwork** | | |
| Pre-finished | Use house hold furniture wax or polish. Cover scuffs and scratches with a wax and stain mixture or matching putty stick. | **Use of water, harsh cleansers, alcohol, or petroleum base solvents.** |
| Stained | Sand and re-stain as required. | |
| **Bed Slides** | Periodic lubrication with a silicone lubricant will enhance the ease of operation and prolong track life. | **Getting excess lubricant on surrounding canvas and upholstery, as it could produce stains.** |
| **MAINTENANCE** | | |
| **Frame, Running Gear** | Check at least every 1000 miles (or twice a season). Rinse with water after salt or chemical contamination, repaint as necessary. | **Road chemicals.** |
| **Tires** | Inflation. (see page 12) | **Over or under inflation. Either may cause problems.** |
| **Rims & Hubs** | Clean and repaint as needed. | **Road damage.** |
| **Wheel Lug Nuts** | Check torque the first 25, 100, and 500 miles and every 500 miles thereafter. | **See Dexter Axle Manual for cautions.** |
| **Wheel Bearings** | Lubrication. Obtain new cotter pins and repack with high temperature wheel bearing grease per Service Interval Chart. | |
| **Brakes** | Check linings or adjust if needed. (See *Service Interval Chart*) | |
| **Dolly Wheel Jack** | Coat threads lightly with axle grease, lube with WD 40. | **Oil.** |
| **Coupler** | Wheel bearing grease on the release lever and socket. | |
| **Ball** | Wheel bearing grease or soap. | |
| **Propane** | Check all lines for crimps or damage. Check for leaks with soapy water. Pressure regulator line pressure is 11 inches of water column. Paint propane bottles white as necessary. | **Overfilling bottles, refilling with engine running or near flame.** |
| **Water** | Check all hoses, fittings, and connections for signs of leakage. | **Allowing water to stand in tank after a trip. Too much pressure. Hooking up to an unfamiliar city water connection without first checking whether a pressure reducing coupler is required. It must not be over 60 PSI.** |
| **Tank Discharge Filter** | Checked and cleaned. Sanitize water system when needed. (See page 11) | |

| COMPONENT | STANDARD CARE | AVOID |
|---|---|---|
| 110 Volt AC | Examine wires and ground | |
| Auxiliary Battery | Check liquid level twice a month. Keep charged. Keep terminals clean. Disconnect battery from converter for long term storage. | Overfilling or low liquid level below plates. |
| Fire Extinguisher | Be sure it is charged. Check pressure monthly and note on inspection tag. | Not replacing after use. |
| Pigtail or Connector | Check wires and insulation. | Corrosion |
| Aluminum, Fiberglass & ABS Plastic | Use warm, soapy water (mild detergent) and a soft bristled brush. Wax with a nonabrasive liquid or paste wax. | Abrasives. Washing or waxing in hot sun. |
| Locks | Lubricate with graphite. | |
| Roof & Seams | Inspect at least every 60 days. Check for gaps and re-caulk using a #999A Dow silicone sealer (available from Starcraft RV, Inc.), or another brand of pure 100% silicone caulk. A similar procedure should be followed for the roof vent and screws. This procedure must be done at least once a year or sooner if necessary. | |
| Extrusions | All should be waxed with a good nonabrasive liquid or paste wax to help preserve the finish and avoid pitting. | |
| Starcraft RV, Inc. Lifter System | Inspect cable for fraying. Inspect spring tubes and spring tube connections at master tube and lifters for damage. Grease master tube annually. Two grease zerks are provided on the master tube. One good pump of grease should be sufficient. Check lifters for damage, scoring and freedom of movement. Lubricate with spray silicone. | Oil, grease or graphite on lifters or cables. |
| Winch | Blow clean with high pressure air.<br>Apply a few drops of light machine oil on the cable drive shaft bolt and the brake shaft bolt. Also apply a few drops of oil on the pawl pivot shaft to prevent seizure (not clicking when raising roof). | Heavy oil or grease on exposed gears and threaded shaft. Avoid any spray lubricant on brake mechanisms. |
| Air Conditioner | Clean evaporator and condenser coils, filter, and pan. Cover outside of conditioner when not in use. | Low voltage. |
| Tent Assembly | See cleaning instructions (page 33). | |

# Front Deck Models

**Your RV is equipped with a front deck for hauling extra cargo. Make sure that you stay within all weight limits for the deck and the loading ramps. It is critical for proper handling and trailer maintenance that you weigh your RV completely loaded before heading out on your trip. Make sure to unload the front deck before unhitching your RV from the tow vehicle.**

**Fig. 45A**

**11RT, 13RT, 14RT & 34RT shown with dual function loading ramps and side rails. Remove clevis pins, unfold, secure to frame with strap and hook before loading or unloading ATV's.**

**Fig. 45B**

**36RT shown with loading ramps stored underneath deck. Remove safety snap pins from side rails and loading ramps. Remove side rails, secure ramps to frame with strap and hook before loading or unloading ATV's.**

STARCRAFT®

CRAFTED TO EXCEED YOUR EXPECTATIONS.™

# IMPORTANT INFORMATION

## AQUALON® CLEANING INSTRUCTIONS
## TENT CARE AND MAINTENANCE

**TOP SURFACE**

1) Dry brush the area to be cleaned to remove surface dirt and dust.
2) Following label instructions, apply pre-wash.
3) Allow to soak*, agitating occasionally.
4) Scrub, using common household scrub brush or scrubbing pad.
5) Following label instructions, add vinyl cleaner
6) Allow to soak•, agitating occasionally.
7) Scrub, using common household scrub brush or scrubbing pad.
8) Rinse thoroughly; allow to air dry. Do Not Store Wet!

**NOTE: *The longer solutions are allowed to soak, the more effective they will be.**

**BACK SURFACE MILDEW REMOVAL**

1) Dry brush the area to be cleaned to remove surface dirt and dust.
2) Following label instructions, apply Tilex, X-14, or a solution of 1/4 cup of Clorox per gallon of warm water.
3) Allow to soak, agitating occasionally.
4) Scrub, using common household scrub brush or scrubbing pad;
5) Rinse thoroughly. Failure to completely remove bleaching compound by rinsing can cause thread deterioration.
6) Allow to air dry.

As with any cleaning procedure, these methods should be tested on a small unobtrusive area to judge their effectiveness.

Any questions about cleaning Aqualon® will be answered by The Astrup Company, 800/78-7601.

**NOTE:** Starcraft RV, Inc. also has available through the Parts Department cleaning agents to help keep tents in “like new” condition. They are Apseal Fabric Protector, Vinyl Clean and Fabric Shampoo.

# Serial Number Identification Form

The following information will be necessary if one of your appliances requires warranty service.
Fill in the available information as soon as possible.

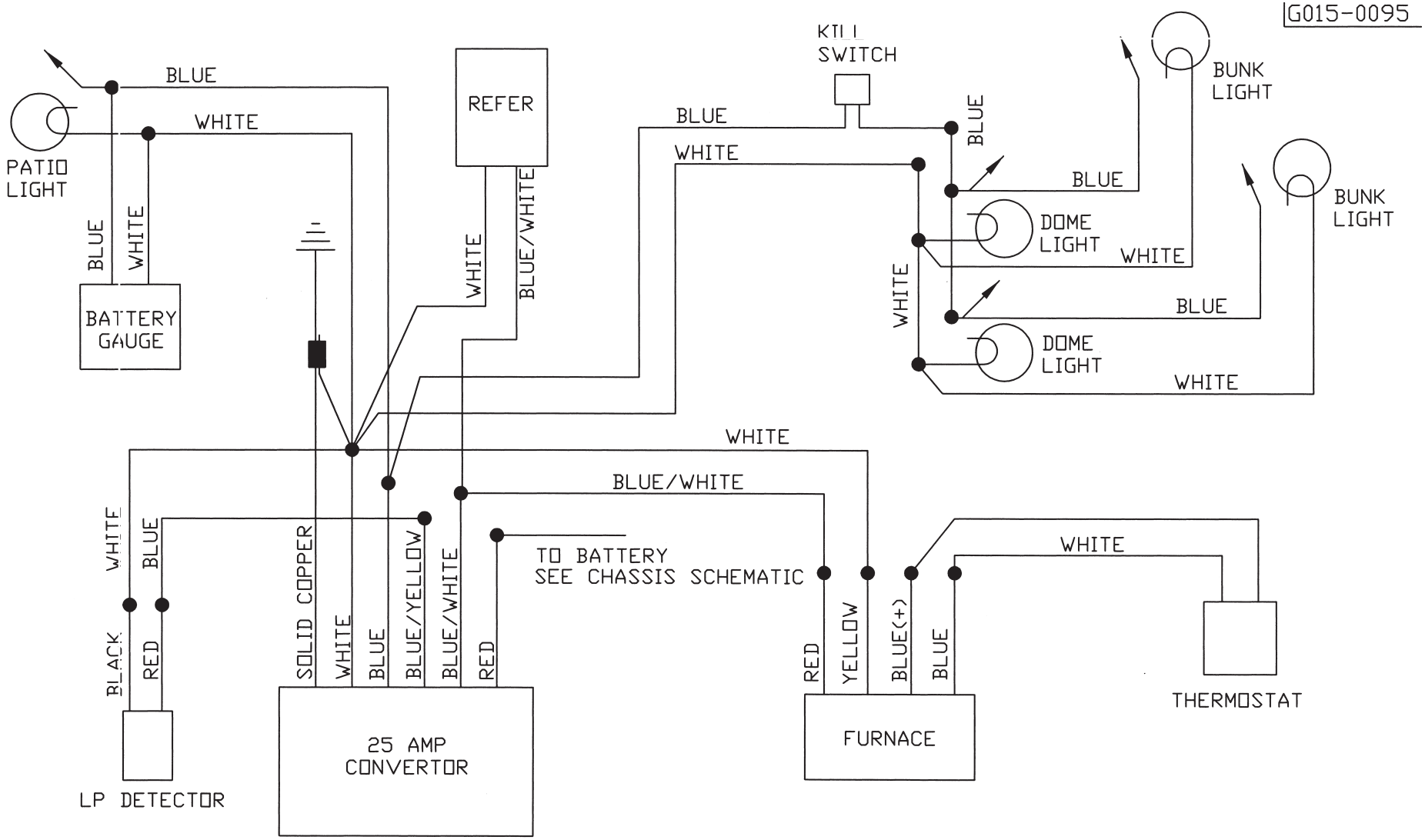
| EQUIPMENT | MAKE | MODEL NUMBER | SERIAL NUMBER |
|---|---|---|---|
| Camping Trailer | | | |
| Door Key | | | |
| Furnace | | | |
| Range | | | |
| Refrigerator/Ice Box | | | |
| Water Heater | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# Option Weights

| OPTION | WEIGHT |
|---|---|
| **Tires:** | |
| **5.30 x 12(c)** | **20 LBS** |
| **ST175 x 80D 13C** | **30 LBS** |
| **LT235/75 R15** | **54 LBS** |
| **ST205/75 D14** | **36 LBS** |
| **Vinyl Tire Cover** | **0.7 LB** |
| **Vinyl Bottle Cover: Single** | **1.4 LB** |
| **Double** | **2 LBS** |
| **Bicycle Carrier** | **23 LBS** |
| **Boat Rack** | **11 LBS** |
| **Self-Storing Awning: 7′** | **24 LBS** |
| **9′** | **27 LBS** |
| **11′** | **29 LBS** |
| **Screen Room: 7′** | **19.7 LBS** |
| **9′** | **20.6 LBS** |
| **11′** | **22.9 LBS** |
| **Bunk Light** | **1.5 LBS** |
| **Double propane Bottles w/Auto Regulator** | **19 LBS** |

| OPTION | WEIGHT |
|---|---|
| **Battery Gauge** | **2 LBS** |
| **Suburban Furnace** | **19 LBS** |
| **Refrigerator:** | |
| **3-way (Dometic RM 2193)** | **32 LBS** |
| **3-way (Dometic RM 4223 – Slideouts)** | **54.5 LBS** |
| **3-way (Dometic RM 7401)** | **64 LBS** |
| **Air Conditioner 13.5 Domestic Brisk Air** | **119.2 LBS** |
| **Water Heater w/Faucet & Pump** | **23.2 LBS** |
| **Electric Brakes** | **9 LBS** |
| **Outside 110 Volt Recept.** | **1 LB** |
| **Step** | **29.8 LBS** |
| **Clothes Bar** | **1 LB** |
| **Outside Shower** | **5 LBS** |
| **Outside Access Door** | **1.5 LBS** |
| **Convenience Package** | **56 LBS** |
| **Deluxe Package** | **12 LBS** |
| **Space Station** | **4.7 LBS** |

G015-0095




SYMBOLS / DESCRIPTION

- CONNECTION
- SWITCH
- FRAME GROUND

REVISED 02-07-06 12:50

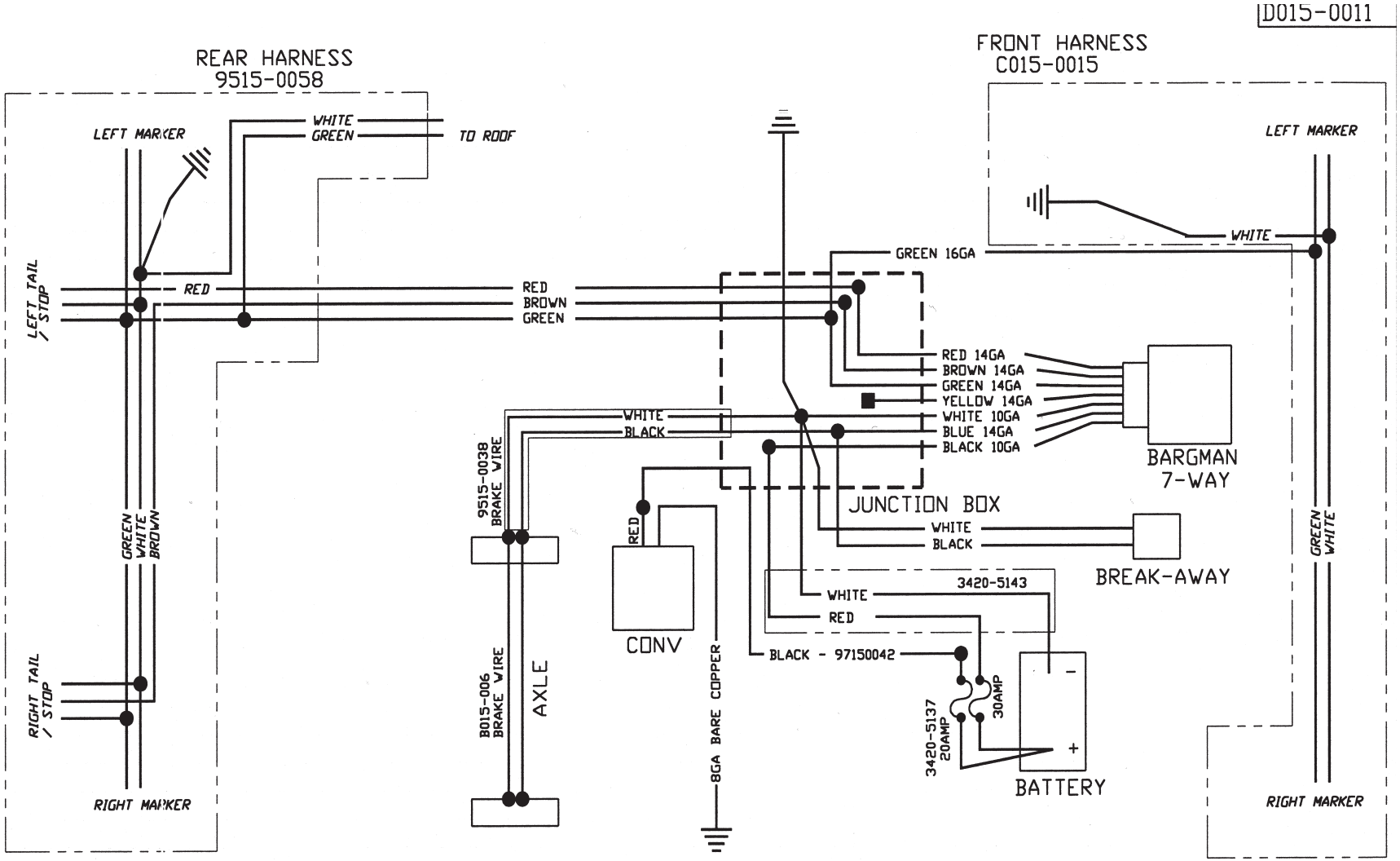
| # | CHANGES | BY | DATE | DCN # |
|---|---|---|---|---|
| A | RELEASED FOR PRODUCTION | DB | 2/7/06 | 06MC |

DO NOT SCALE DRAWING
SCALE: 3/4"=1" (B2)
MAT'L: NOTED
DWN. FOR: 2006 STARCRAFT TENTS
DWN BY: RD DATE: 2/7/06
APPRD BY: DATE:

STARCRAFT R.V.
WEST MICH. ST., TOPEKA, INDIANA 46571

SCHEMATIC, 12V SYSTEM

G015-0095 1 of 1


D015-0011
REAR HARNESS
9515-0058
FRONT HARNESS
C015-0015
LEFT MARKER
WHITE
GREEN
TO ROOF
LEFT TAIL
/ STOP
RED
RED
BROWN
GREEN
GREEN
WHITE
BROWN
RIGHT TAIL
/ STOP
RIGHT MARKER
LEFT MARKER
WHITE
GREEN 16GA
GREEN
WHITE
RIGHT MARKER
RED 14GA
BROWN 14GA
GREEN 14GA
YELLOW 14GA
WHITE 10GA
BLUE 14GA
BLACK 10GA
BARGMAN
7-WAY
JUNCTION BOX
WHITE
BLACK
BREAK-AWAY
WHITE
BLACK
9515-0038
BRAKE WIRE
RED
CONV
3420-5143
WHITE
RED
BLACK - 97150042
B015-006
BRAKE WIRE
AXLE
8GA BARE COPPER
3420-5137
20AMP
30AMP
BATTERY
Symbols/Descriptions
Connection
Frame Ground
In-Line Fuse
REVISED 02-14-02 11:11
# CHANGES BY DATE ECN #
A RELEASE DB 02/14/02 2003MY
DO NOT SCALE DRAWING
SCALE: 3/4"=1" (B2)
MAT'L: NOTED
DWN. FOR: STARCRAFT TENTS
DWN BY: DB DATE: 02/14/02
APPRD BY: DATE:
STARCRAFT R.V.
WEST MICH. ST., TOPEKA, INDIANA 46571
SCHEMATIC, CHASSIS
D015-0011
1 of 1

## Full Height Entrance Door Set-up

**After unhooking and leveling the camper, crank up the roof and set the stabilizer jacks. Install all the bed braces and pull both ends out. Set up the bunkends and zipper the tent panels closed at each lifter.**

**Unlatch the two wing catches on the off door side of the trailer that are holding the entrance door to the ceiling. Fig. 46A. Let the door hang on the cables. Fig. 46B. On the door side of the trailer, you will need to lift the entrance door slightly to unhook it from the storage bracket. Fig. 46C. Move the door toward the off door side of the trailer slightly to allow downward movement of the door.**

**Lower the door assembly while pushing the entire door outside of the camper. The top of the door will remain inside the camper. Lift the door vertically while fitting the top of the door under the roof sideboard. Turn the two wing catches located on the roof sideboard to hold the top of the door securely. Fig. 46D. open the door and pull inward on the sides of the door frame until it is seated in the lower door jambs. Turn the four wing catches on the door frame to secure it to the jambs. Fig. 46E. Fasten the tent panel Velcro to the entrance door Velcro.**
**To store door for travel, reverse this procedure.**

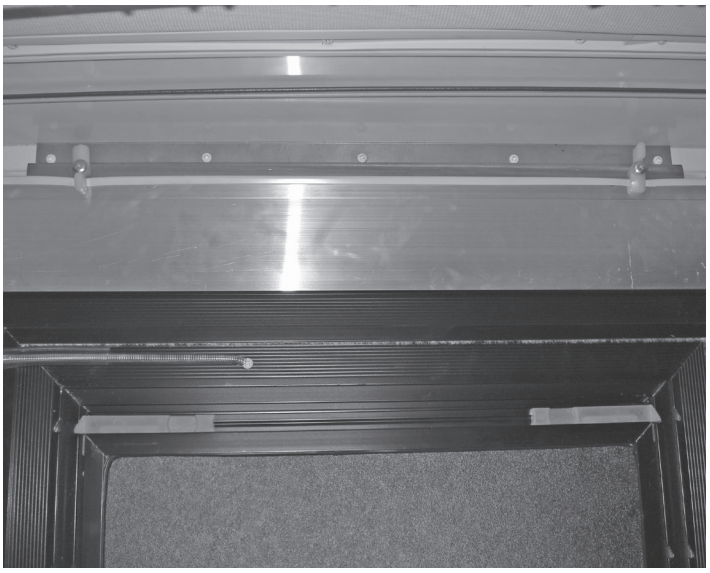


Fig. 46A

Fig 46E

Fig. 46B

Fig 46D

Fig 46C

## Models with Swing Down Sink Faucet

**Before closing the camping trailer, it is important that the sink faucet is lowered to allow the beds to be pushed in. Otherwise, serious damage to the faucet and mounting board will occur. Turn the spout as shown in Fig. 47A so it is parallel with the back of the sink. Grab the knob on the faucet mounting board and pull up slightly while twisting the thumb latch. Gently lower the swing down faucet assembly into the cavity behind the sink. Fig. 47B**

**Make sure the faucet spout is low enough before trying to push the beds in. If not, lift the assembly by the knob and readjust the spout to the correct position. Fig. 47C**

**Fig. 47A**

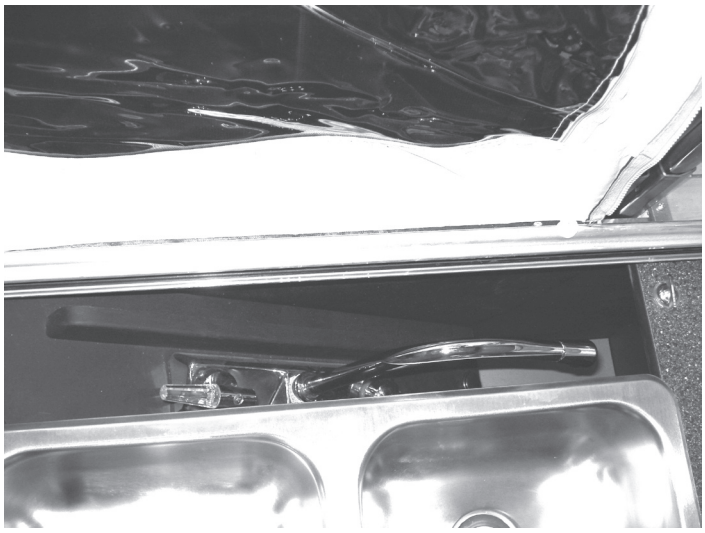


**Fig. 47B**

**Fig. 47C**

Go RVing®

**Starcraft RV, Inc.**
536 Michigan St. – P.O. Box 458 – Topeka, IN 46571 – 800-945-4787 – 260-593-2550
www.starcraftrv.com